HELSINKI SCHOOL OF ECONOMICS
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DETERMINANTS OF BOARD STRUCTURES IN FINNISH PUBLIC LISTED CORPORATIONS

Empirical evidence from 2007

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Abstract

Research title
Determinants of board structures in Finnish public listed corporations - Empirical evidence from 2007

Research objectives
The objective of this study is to research determinants of board structures in Finnish public listed corporations. The motivation to the study is that boards by definition occupy a crucial position as the head of the firm's internal governance (Jensen, 1993), but evidence on their role in Finnish firms is limited. Moreover, internationally increasing importance of capital markets for firm governance, and recent updates in Finnish governance policies make boards a relevant research topic. For different board structures, we examine primarily board size and board composition, and also to less extent presence of female and foreigner directors. In empirical tests, we will apply the frameworks used by Boone et al. (2007), and Coles et al. (2008). First, we approach determinants of board structures through the three hypotheses provided by Boone et al. (2007): Scope of the operations hypothesis, monitoring hypothesis, and negotiation hypothesis. Second, relying on the methodology by Coles et al. (2008), we test how board structures relate to firm value, subject to firm-specific information needs.

Sample group and data
Our research is based on boards that served for the year 2007. Our sample consists of 107 Finnish corporations that were listed to the OMX Helsinki Stock Exchange in 2007. The data on boards is based on those boards that were elected in annual general meetings in the year 2007. The data on boards has been hand-collected from the firms' annual reports and corporate websites, and also complemented with inquiries to the companies. The data on firm characteristics has been hand-collected from annual reports and corporate websites, and retrieved from the Worldscope database. Firm characteristics are mostly based on data from the year-end 2006, while some performance measures are based on the year-end 2007.

Methodology
Empirical tests were made with ordinary least squares (OLS) regressions. Regressions were completed using SAS Enterprise Guide 4 software.

Results
Board size, and to some extent also board independence, as well as presence of female and foreigner directors increase with the firm's operational scope as predicted. Evidence on the hypothesized negative relation of board size and independence to monitoring costs was not convincing, but we obtained signs that board size decreases with greater share price volatility. Similarly, the predicted negative relation between insider influence and board independence could not be proven, but our results should warrant further research on this topic. Finally, the tests on how board size and independence affect firm value subject to the firm's information needs did not yield statistically significant results. However, the results for board size encourage further examination.

Key words
Board composition, board independence, board size, board structure, boards, boards of directors, corporate governance, governance, internal governance

Tiivistelmä

Tutkielman nimi
Hallitusten rakenteiden määräytyminen suomalaisissa pörssiyrityksissä – aineistoa vuodelta 2007

Tutkimuksen tavoitteet
Tämän tutkimuksen tavoitteena on selvittää hallitusten ominaisuuksia määrääviä tekijöitä suomalaisissa pörssiyrityksissä. Tutkimuksen taustalla on hallituksen keskeinen asema yrityksen sisäisen hallinnon johdossa (Jensen, 1993), sekä vähäinen tuntemus hallitusten roolista suomalaisissa yrityksissä. Lisäksi, pääomamarkkinoiden kansainvälisesti kasvava vaikutus yritysten hallintoon tekee hallituksista ajankohtaisen tutkimusaiheen. Hallitusten rakenteista tutkimme pääasiassa hallituksen kokoa ja riippumattomuutta, sekä vähäisemmin myös naisten ja ulkomaalaisten jäsenyyttä. Empiirisessä tutkimuksessa sovellamme malleja joita Boone et al. (2007), sekä Coles et al. (2008) ovat aiemmin käyttäneet omissa tutkimuksissaan. Ensin Boone et al. (2007) mukaisesti tutkimme hallitusten rakenteita määrittäviä tekijöitä kolmen hypoteesin avulla: hypoteesi toiminnan laajuudesta, hypoteesi valvonnan kustannuksista, sekä hypoteesi vaikutusvallasta. Tämän jälkeen Coles et al. (2008) mukaista metodologiaa käyttäen tutkimme vaikuttavatko hallitusten rakenteet yritysten arvoon eri tavoin riippuen yrityskohtaisesta tiedon tarpeesta.

Otanta
Tutkimus perustuu niihin hallituksiin jotka palvelivat yrityksissä vuonna 2007. Otantamme koostuu 107 suomalaisesta pörssiyrityksestä jotka olivat listattuina OMX pörssin Helsingin listalla vuonna 2007. Tiedot yritysten hallituksista perustuvat niihin hallituksiin, jotka valittiin vuoden 2007 yhtiökokouksissa. Hallituksia koskevat tiedot on kerätty käsin yritysten vuosikertomuksista ja Internet-sivuilta, sekä tietoja on täydennetty tiedusteluilla yrityksiin. Tietoja yritysten ominaisuuksista on kerätty käsin yritysten vuosikertomuksista ja Internet-sivuilta, sekä Worldscope-tietokannasta. Tiedot yritysten ominaisuuksista perustuvat enimmäkseen vuoden 2006 lopun tietoihin, joskin eräät tuloksellisuutta kuvaavat mittarit perustuvat vuoden 2007 lopun tietoihin.

Menetelmät
Empiiriset testit ovat tehty käyttäen pienimmän neliösumman (OLS) regressioita. Regressiot ovat tehty käyttäen SAS Enterprise Guide 4 ohjelmistoa.

Tulokset
Hallituksen koko, ja joissain määrin myös hallituksen riippumattomuus sekä naisten ja ulkomaalaisten jäsenyys, kasvavat oletetun mukaisesti yrityksen toiminnan monimuotoistuessa. Hallituksen koon ja riippumattomuuden oletettua negatiivista suhdetta valvonnan kustannuksiin ei pystytty luotettavasti todistamaan joskin tulokset antavat viitteitä osakkeen volatiliteetin ja hallituskoon negatiivisesta suhteesta. Samoin odotettu toimitusjohtajan aseman negatiivinen vaikutus hallituksen riippumattomuuteen ei ollut tilastollisesti merkittävä, mutta tulosten suunta antaa mahdollisesti aihetta lisätutkimukselle. Myöskään hallituksen koon ja riippumattomuuden vaikutusta yrityksen arvoon, huomioiden yritysten tiedon tarpeet, ei kyetty todentamaan. Tulokset hallituskoon osalta voivat kuitenkin olla kiinnostavia jatkotutkimuksen kannalta.

Avainsanat
Corporate governance, hallitukset, hallituksen koko, hallituksen rakenteet, hallituksen riippumattomuus, hallinto, hallitus

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1. Introduction

1.1 Background: NIC and Nordic corporate board diversity

In November 2006, the Nordic Innovation Centre (NIC) published a study called "A Nordic perspective on corporate board diversity," that was authored by Randøy, Oxelheim, and Thomsen. The study set to research board diversity in the 500 largest companies in Denmark, Norway and Sweden.

As for diversity within boards, the study found that Scandinavian boards generally were not very diverse in gender and nationality, whereas there was more variance in the age of board members. Regarding board characteristics across Scandinavian nations, significant differences existed. Danish board members were found to be relatively older and less diverse than those in Sweden and Norway. Higher gender diversity in Sweden and Norway could potentially be attributed to political reasons. Yet, low female representation in Danish boards appeared odd. Industry and size of the company were found to affect board diversity, while the average age of board members or connections of the chair were not found to have an influence.

Regarding the relation of board diversity to corporate performance in terms of share value or profitability, no causality was found. The study concludes that while greater board diversity does not seem to enhance corporate performance, no value destruction follows either. Yet, increasing the size of the board was found to potentially interfere with corporate performance.

The NIC study examined board diversity in large companies in Denmark, Norway, and Sweden. In 2007, NIC continued to further study Nordic boards with a project that gathers data on boards in Denmark, Norway, Sweden, and Finland. Contributing to the project, with a fellow student we gathered data on boards of Finnish public listed corporations from year 2007. The set of data collected for the purposes of the NIC project included various board characteristics, such as educational background, director ownership, and information on board committees. Using part of this data on boards with

additional variables on firm characteristics, this Master's thesis examines determinants of board structures in Finnish public listed corporations.

1.2 Research problem and research gap

During the recent two decades, commodity and financial market conditions have changed fundamentally in Finland. Markets for both products and capital have undergone liberalization with integration into the international marketplace. Finnish firms' operations, competition, and ownership contain increasingly international characteristics. Corporations, particularly stock listed companies, have become subject to more market economy based principles than before (Pajarinen and Ylä-Anttila, 2006). Finland does not yet equal Anglo-Saxon nations in market philosophy that is dominated by entrepreneurship and promotion of shareholder wealth, but these principles have gained ground in the Finnish economy as well.

Changes in corporations' ownership structures and operations bring challenges also for board work. In many cases, boards are supposed to see after fast moving equity capital, and guide growingly international operations. In terms of corporate governance, boards by definition perform an important function by being the interface between the owners whose wealth is tied to the corporation's fortune, and the management who has substantial control over the firm's assets. Overall, both product and capital markets have become increasingly dynamic and these challenges are pronounced when the corporation has multinational operations and ownership base.

Given the above, it can be presumed that the board is important for the firm's performance. Thereby, from research perspective it seems worthwhile to examine Finnish corporate boards, and accordingly the research problem underlying this study is as follows:

- What is the role of boards in Finnish corporations?

Furthermore, in order to build better understanding in the substance of board work in Finnish corporations, and to provide basis for evaluating how boards contribute to firm value, this paper will focus on how the firm's operational and governance

characteristics affect the board's structures. Consequently, the research gap in this thesis is as follows:

- What firm characteristics determine board structures in Finnish corporations?

1.3 Research objectives and questions

Intuitively, boards as such are not likely to add value for corporations, but the board's qualities have to match with the associated firm characteristics to bring about better firm performance. Consequently, this paper does not attempt to examine whether certain types of boards exist or affect firm performance in the first place, but whether board structures are determined given particular firm environments. The following figure is to illustrate the board's role in the firm.

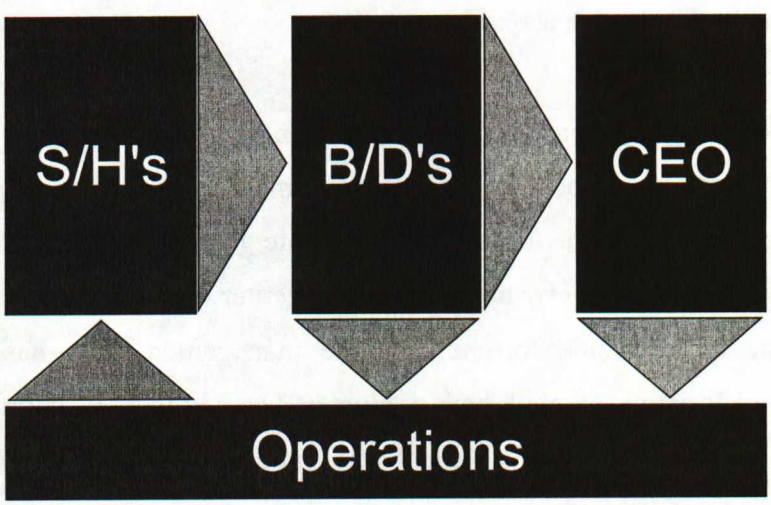

Figure 1. The board's position in the firm

With regards to the figure, duties of the board come in two major dimensions. First, being the elected representatives of the firm's shareholders, the board monitors the firm's CEO or the top management that runs the firm's operations on day-to-day basis. This viewpoint to the board as a supervisory body is based on potential managerial self-dealing issues that, unless controlled for, potentially undermine maximization of the firm's potential value for shareholders. Second, the board has responsibility for advising the corporation in major decisions that contribute to the firm's long-run operational profitability. These two duties set different and sometimes conflicting (Murphy and McIntyre, 2007) requisites for the board's structure. In the end the firm's shareholders

obtain return on their investments from the firm's operational profits that are affected also by the board's capability of carrying out its tasks.

The objective of this research is to empirically study whether different board structures are determined by given firm characteristics. Both monitoring and advisory tasks evidently are relevant to the firm's value, and thereby we will give regard to both of them in our examination. To reach the research objective, the following questions need to be answered:

- How are Finnish corporate boards structured?
- Are board structures determined by operational and governance characteristics of the firm?
- What factors can affect validity of the results?

Murphy and McIntyre (2007) write that prior research on boards has mainly attempted to link individual board characteristics with financial firm performance, and that future research should develop theoretically more logical model for board effectiveness. Thereby, a contribution from this study is that boards are examined with consideration to underlying firm-specific circumstance.

1.4 Research sample group

The sample for the empirical research will include all public listed companies in the OMX Helsinki Stock Exchange in 2007, with the exceptions listed in the empirical section. Choosing listed companies as the sample group to this research can be argued for with the following assumptions:

- Compared to private enterprises, separation of ownership and control is particularly evident in stock listed companies, and the role of boards should thereby be pronounced. However, it should be acknowledged here that Eisenberg et al. (1998) found a relation between board size and profitability in small and mid-size Finnish firms.
- Public listed firms are assumingly characterized by relatively greater shareholder pressure, more international operations, and dynamic product

markets that set demands for the board' work, and thereby make the board crucial for the firm's performance.

- Universal capital market information and reporting standards for stock listed companies allow effective empirical information gathering, analysis and comparison between the sample firms.

1.5 Earlier Master's theses on boards of directors

There are some earlier Master's theses that examine corporate boards in Finland. Rämänen (2003) studies board structures and turnovers in public listed Finnish firms during 1994-2002. Rämänen finds that the number of inside directors in boards decreased considerably during the time period. Poor firm performance and changes in sales were found to increase director turnover, while inside directorship and family ownership decreased director turnover. Moreover, state ownership and distributed ownership related positively to board member turnover following poor firm performance.

Based on a sample of 63 companies listed to the Helsinki Stock Exchange, and with data from the year 2000, Valento (2003) studied links between board independence, board size, board ownership, and company performance. Also the effects of business environment, ownership, and governance structures on board size and board independence were examined. Board size, board independence, and board ownership were not found to influence firm performance. Board size was found to relate with board independence, the number of blockholders, domestic institutional holdings, and inside director ownership. Board independence was found to relate with the size of blockholdings, growth opportunities, and inside director ownership.

Furthermore, Pöysä (2007) and Matveinen (2005) build indexes on board governance, and find evidence that better governance contributes positively to Tobin's Q. Finally, Tukia (2001) studied board entrenchment, and Selosmaa (2000) examined board characteristics combined with a survey made on equity analysts' views to these boards.

1.6 Definitions

Board composition

Board composition refers to the fractions of inside and outside directors in the board, or the fractions of independent and non-independent directors.

Board structure

Board structure is a used as a general term that covers various board characteristics, such as board size, directors' nationalities, or board composition.

Corporate governance

Corporate governance defines for what purposes, or in whose interest the corporation in the end is run. Furthermore, corporate governance considers how the potentially conflicting interests of the corporation's various stakeholders are aligned when decisions are made, so that reaching the corporation's objective is supported.

Corporate governance mechanism, Corporate governance institution

Corporate governance mechanism, or corporate governance institution, is a system set to eliminate or alleviate corporate governance problems.

Independent/Non-independent director

See the definition for inside/outside director in below.

Inside/Outside director

An inside director is a member of the board of directors who is also employed by the company. An inside director is always a non-independent director. Several studies (e.g. Shivdasani and Yermack, 1999), divide outside directors into grey outsiders and independent outsiders. Grey outsiders are those outside directors who have past or current relationships to the firm or the firm's CEO. Independent outsiders are other outside directors that do not fall within the definition of grey outsiders. In this paper we do not make a difference between grey outsiders and independent outsiders, but we rely on the definition of independent versus non-independent director. We record director independence as stated by the company. By definition, companies should report director

independence according to the prevailing corporate governance code in Finland, and grey outsiders would then be classified mostly as non-independent directors.

Tobin's Q

Tobin's Q the replacement value of the firm's assets, that is, market value of the firm's equity plus market value of the firm's debt. Tobin's Q is used as a measure for the firm's total value. We will not be able to calculate the actual Tobin's Q since we do not have all the necessary data, but we will use an approximation that is specified later.

1.7 Limitations to the research

Due to limited data, we will not do full replication of the models developed by the author's that we refer to in our empirical work. Furthermore, the original studies employed data over several years, while we only use data on a single year. Some further validity constraints apply to our methodology, and these shortcomings will be described in more detail when discussing our empirical results.

Moreover, we will use rather straightforward replications of the empirical models provided by the authors that we refer to. Since the scope and resources of our study are limited, we will not attempt to adjust the models to the business and governance environments particular to our sample group. This may affect our potential of obtaining significant results, as well as interpretation of our results.

1.8 Structure of the paper

Chapter 1 introduces research topic and motivations behind it. Research problem, research gap, and the research objective are introduced, as well as definitions and limitations are outlined.

Chapter 2 overviews background theory on corporate governance that is relevant to understand how boards relate to the overall framework of governance mechanisms. We discuss different views to corporate governance, and present how corporate governance problems are countered with various governance mechanisms.

Chapter 3 discusses boards of directors as a governance mechanism in more detail. We review earlier research on boards that is relevant to our study. Finally, we set the hypotheses for our empirical tests.

Chapter 4 presents the methods and data used in our empirical examination. We define the variables that we use in testing our hypotheses, and we introduce the sample group and data.

Chapter 5 discusses results of the empirical study and their validity.

Chapter 6 concludes the study with summary of key findings, as well as suggestions for further research and practical implications.

2. Review of corporate governance theory

2.1 Agency problems in corporations

Corporate governance topics are usually approached through searching various solutions to agency problems in corporations. The basic nature of corporate agency problems can be illustrated through description of a simple corporate governance setting that involves relationships between shareholders, managers, and the board of directors. The roles of shareholders and managers in a corporation are somewhat self-explanatory, and boards do not exist in corporations by accident either. In Finland, Limited Liability Companies Act (Chapter 6, Section 1, (1)) requires a limited liability companies to have a board in place:

"A company shall have a Board of Directors. It may also have a Managing Director and a Supervisory Board."

However, Hermalin and Weisbach (2003) note that boards do not exist in organizations simply due to legislative requirements. Their argument is based on the fact that boards exist also in other than regulated organizations, boards are often bigger than required, and markets have not effectively required removal of boards. Hereby, there must some evolutionary explanation that accounts for why boards exist in organizations, including stock listed corporations.

Jensen and Meckling (1976) consider that theories of the firm so far had focused on maximization of the firm's present value, but been incapable of explaining how conflicting objectives of individuals are settled within the organization. The authors draw from property rights theory in that costs and rewards within an organization are allocated on basis of implicit and explicit contracting, and these contracts affect individuals' behaviour. This is the case also in contracts between owners and managers of the firm, and this setting can be seen as an agency relationship. An agency relationship arises when one party (the principal) contracts another party (the agent) to perform some service on behalf of the former, and the contract involves delegation of some decision making authority to the agent. Provided that both parties rationally

maximize their own utility, it can be assumed that the agent does not always act according to the best interest of the principal. Given that to alleviate this interest conflict is not free of charge and yet it can be assumed that the agent's decisions are not always fully optimal from the principal's point of view, there is so-called agency cost from the relationship. Jensen and Meckling conclude that even though agency costs between owners and managers seem apparent, corporations had remained as a growing organizational form on the market thereby suggesting that investors and creditors were content with results.

Corporation as an organizational form is further addressed by Fama and Jensen (1983), who discuss survival of organizations, in which decision makers do not bear all wealth effects that their decisions cause. In these organizations, decision and risk-bearing functions are separated. Benefits of specialization of the two functions and controlling for agency problems can make this a viable organizational arrangement. The authors view organizations as sets of contracts, which define how risks are borne and how decisions are made. The risks of most agents are limited by offering fixed or performance-based compensation. In exchange for limitation of risk, these agents contract to use their resources in favour of those agents that carry the remaining risk that the authors call "residual claims." Common stocks of large corporations are one form of taking on residual claims. Decision making consists of four parts: initiation, ratification, implementation, and monitoring. Initiation and implementation form decision management, and ratification and monitoring form decision control. Agency problems come about when decision management agents are not exposed to major wealth effects that result from their decisions, and they are likely to make decisions that are not in the interests of the agents that carry residual claims. Use of common stock is an example how decision management and bearing residual risk are separated. Separation of decision management and residual risk bearing leads into agency problems that are dealt with by separating decision management and decision control.

In large and widely held public held corporations, also residual risk and decision control are often separated (Fama and Jensen, 1983). Agents who bear residual claims, i.e. stock holders are often too many and hold too small stakes so that all of them would actively

use their control rights in the corporation (Hart, 1995). In practice then, stockholders transfer control rights to boards of directors, who further delegate some of the rights to managers. Boards of directors are hereby used to alleviate agency problems that arise as residual risk and decision management are separated, and as residual risk agents are too diffuse to effectively exercise decision control.

2.2 Corporate governance

2.2.1 The concept of corporate governance

In the above, a basic corporate governance dilemma is described: An agency problem exists in the contract between shareholders (the principals) and managers (the agents). The agency problem is further pronounced by diffuse share ownership so that incentives for effective monitoring by the principals are diminished. This agency issue is then alleviated with an intermediary organizational body that is to represent the shareholders' interest, namely the board of directors. The board of directors makes the corporation's governance mechanism, which is set to maximize return for those whose risk is not limited with fixed compensation, that is, the shareholders.

However, the agency dilemma between shareholders and managers as well as the goal of maximizing shareholder value is only one, although an important view to the corporation's agent-principal roles and objectives of governance. As Jensen and Meckling (1976) write, the corporation, as all organizations, in effect is a legal fiction that actually is a set of contracts between owners of various inputs and agency problems can take place in all these contracts. Becht et al. (2002) describe corporate governance as the issue of one agent, the CEO making commitments on behalf of multiple principals. In this they refer to Bernheim and Whinston (1986), who stretch the traditional principal-agent setting and define "common agency," that is, how a single agent's actions have effect on multiple principals whose interests may be conflicting. In addition to extending the agency problem view from shareholder perspective across the entire corporation, Becht et al. also generalize the potential issue of dispersed principals to apply not only to shareholders, but also to various other stakeholder groups, such as bondholders and employees.

Generally, the concept of corporate governance considers how the potentially conflicting interests of the corporation's various stakeholders are aligned when decisions are made. Viewpoint to corporate governance is often taken from negative perspective, that is, how to prohibit stakeholders from making organizational decisions that are primarily to their own benefit at the other stakeholders' expense. Thereby, corporate governance is regarded as a way to deal with corporate conflicts of interest (Demski, 2003). Indeed, recent corporate frauds, such as the Enron case, and growing complexity of business structures (ibid) warrant approaching corporate governance arrangements with an ultimate goal of eliminating conflicts of interest.

2.2.2 Shareholder and stakeholder approaches to corporate governance

Beyond general definitions of the principal-agent dilemma and corporate governance, there are different views as to what should be the objective of corporate governance arrangements (Becht et al., 2002). Potentially one of the most fundamental divisions regarding the principles of corporate governance is made between shareholder and stakeholder approaches (Vilanova, 2007).

The perception on the role of managers is crucial in the division between shareholder and stakeholder views. In shareholder approach, corporate governance arrangements should be geared to minimize managerial inefficiency and to maximize shareholders' wealth. Thereby, the main issue in shareholder-based corporate governance is to limit possibilities for managers to detriment shareholders' wealth, and rather give managers incentives that encourage increasing share value. (Vilanova, 2007)

In stakeholder approach, the viewpoint towards managers is less negative (Vilanova, 2007). Furthermore, stakeholder approach considers that a corporation has responsibilities to all groups that have a stake in the corporation's undertakings, not only shareholders. Freeman and Reed (1983) define stakeholders in wide and narrow senses: The former includes any stakeholder that affects or is affected by the organization's objectives, while the latter restricts to those stakeholders that the organization's existence depends on. Freeman and Reed argue that from the viewpoint of corporate strategy the wide sense of the definition should be adopted, since all those

stakeholders that potentially influence the corporation's objectives have to be recognized. (Freeman and Reed, 1983)

Jensen (2001) criticizes traditional stakeholder approach, not for its attempt to account for all parties that affect the corporation, but for lacking a clear corporate objective and thereby obscuring purposeful managerial decision-making, and effectively allowing for managerial self-dealing. From economic efficiency point of view, given elimination of monopolies and externalities, the corporation's objective ought to be maximization of the firm's long-term total market value. This translates into the value of all financial liabilities, not just share value. Maximizing long-term total firm value is equivalent to maximization of social welfare and to obtain this long-term value maximization, all stakeholders that affect the corporation's value have to be given consideration. Hereby, Jensen combines stakeholder theory and the objective of value maximization into what he calls "enlightened value maximization," or alternatively, "enlightened stakeholder theory." According to Jensen, this approach uses much of the logic of corporations accounting for multiple constituencies that is characteristic to stakeholder theory, but allows for necessary tradeoffs between stakeholders in order to maintain a single objective, that is, long-term firm value maximization. (Jensen, 2001)

As apparent from the above, the debate on the appropriate approach to corporate governance extends back to more fundamental questions on the corporation's objective (Vilanova, 2007), or the corporation's substance in the economy (Jensen, 2001). From aggregate economic efficiency perspective, it can be argued that corporations should be organized to produce the maximum overall benefit for their interest groups. A key question then is whether shareholder value can be regarded as the correct benchmark for overall economic efficiency. (Becht et al., 2002)

Shleifer and Vishny (1997) write that the OECD nations have recognized managers' duty to represent shareholders' interest. Reasoning to this is that most other stakeholders have more limited risks than shareholders, and shareholders thereby should be provided with better protection. The OECD Principles of Corporate Governance (2004) do consider also other, less market-oriented factors that affect corporate decision-making,

such as ethical, societal and environmental interests. For more in-depth consideration of these however, reference is made to other instruments issued by the OECD and other international organizations. This logic resembles that of Jensen (2001) in the above, who suggests firms' objective to be long-term value maximization, provided that monopolies and externalities are eliminated as these cause firm value maximization to lead into suboptimal overall social welfare. According to Jensen, the duty to eliminate these market imperfections should be at the government.

In conclusion, the OECD Principles of Corporate Governance says to focus on issues that arise from separation of ownership and control. Nonetheless, the Principles note that this does not signify limiting solely to the relationship between shareholders and managers. According to the Principles, corporate governance relationships may entail various parties, such as different types of equity holders, management, creditors, employees, government, and other stakeholders. (OECD, 2004)

There hardly is a universally acknowledged benchmark to measure overall benefit from corporations, let it be economic efficiency or some other outcome. In the absence of an established objective for corporations, there neither is a commonly agreed corporate governance approach for gearing firms towards optimal performance. One fundamental factor that may cause divergence between shareholder and stakeholder views is the time-horizon that is used when assessing firm value. Jensen (2001) underscores the maximization of long-term value as the corporation's objective and acknowledges that financial markets can be too short-sighted to effectively recognize long-term value maximization. Correspondingly, Vilanova (2007) makes note of linking shareholder and stakeholder approaches with finance and strategy based views to corporations, respectively.

Shareholder and stakeholder approaches to corporate governance can be regarded as somewhat extremist viewpoints, with characteristic rationales and shortcomings, some of them discussed above. Given this, Jensen's logic of combining the two angles seems to make sense. However, without going into more detailed evidencing on how corporations should contribute to the society, how this can be objectively measured, and

how corporate governance consequently should be arranged, this paper will primarily use shareholder approach to corporate governance. Thereby, unless otherwise noted, in the following corporate governance is referred to as issues, institutions, and mechanisms that affect shareholder value.

Shareholder-based viewpoint to corporate governance is promoted at least for three reasons. First, shareholder approach is applied in most of the prior research relevant to our paper. Second, objective interpretation of research results is rather straightforward when financial measures, such return on assets, are used as benchmarks. Third, shareholder approach to the corporation's objective seems to be recognized in some of the recent and relevant policy updates on corporate governance, such as the OECD Principles (2004), and the Finnish Companies Act (2007). [1]

The choice to rely mainly on the shareholder view to corporate governance is not to argue that shareholder approach overall simply is better than stakeholder approach in making the best out of corporations. We will recognize corporate governance considerations broader than mere minimization of managerial self-dealing, and in the empirical research we will use a performance measure that recognizes the value of the entire corporation, not only its equity value. This is in line with Jensen (2001), who argues for maximization of the firm's long-term total market value, not just equity value.

2.3 Corporate governance problems and mechanisms

2.3.1 Corporate governance problems

Roe (2004) uses ownership characteristics to divide shareholder perspective on corporate governance into vertical and horizontal dimensions. In the vertical dimension, the corporation has several comparably small shareholders and the main issue concerns making the CEO promote shareholder value. In the horizontal dimension, there are one or more dominant shareholders, and the key concern is preventing large shareholders from suppressing minority shareholders' interests.

[1] Limited Liability Companies Act (Part 1, Chapter 1, Section 5 - Purpose: *"The purpose of a company is to generate profits for the shareholders, unless otherwise provided in the Articles of Association."*

In the above illustration, two types of fundamental shareholder-related corporate governance problems are illustrated: At one end disperse shareholders have to control for managerial agency problems, and at the other end minority shareholders have a threat of self-dealing by a dominant shareholder. As obvious, concentration of share ownership is a remedy to agency problems, but simultaneously a potential source of other types of governance issues. In either case, the bottom line is about preventing some party from undermining the share's optimal value.

As a complementary viewpoint to shareholder-related governance issues, it is worth giving notion to the potential conflict of interest between shareholders and debtholders. In case the corporation assumes higher levels of risk, there is effectively a transfer of corporate value from debtholders to shareholders. Debtholders are entitled to fixed income only, while shareholders gain all residual profits after interest payments and loan amortizations are settled. Thereby, given that debt pricing is not adjusted with increased risk, additional profits from successfully increased risk end to shareholders. Nonetheless, in case of bankruptcy shareholders are not liable for debtholders' claims. (Moerland, 1995)

The above corporate governance issues relate to the shareholder perspective described in the previous section. In addition to the vertical and horizontal dimensions, Roe (2004) defines also the concept of "external corporate governance" that resembles the stakeholder perspective defined earlier. Here, consideration is given to how the corporation maintains relations with stakeholders also other than shareholders, such as the society and employees. Roe writes that consideration of external governance issues has been less prominent in the US, but more present in many other regions, as we will discuss later.

2.3.2 Corporate governance mechanisms

Corporate governance problems, i.e. undermining shareholder value or other governance goals as described earlier, can be countered with corporate governance mechanisms. These may also be referred to as corporate governance institutions, as

done by Roe (2004). In more detail, for instance Hart (1995) writes that to control for managers' counterproductive undertakings, corporate governance can be enhanced for example with boards of directors, large shareholdings, threat of proxy fights, market for takeovers, and financial structure. Becht et al. (2002) adds executive compensation arrangements and clearly defined CEO duties coupled with class-action suits as measures for promoting investor protection. In turn, employee representatives in boards or anti-takeover laws initiated by regulators are examples of mechanisms that are not originated purely for the purposes of shareholder value maximization (Roe, 2004).

Individual corporate governance mechanisms can be systematically grouped. Jensen (1993) recognizes four "control forces" that drive managers to make decisions valuable to the society: Capital markets, the legal/political/regulatory system, product and factor markets, and the internal control system headed by the board of directors. Shleifer and Vishny (1997) generalize corporate governance mechanisms as "economic and legal institutions that can be altered through the political process." Denis and McConnell (2003) divide corporate governance mechanisms into internal and external mechanisms. Internal mechanisms include for instance boards of directors and ownership structure, while the market for takeovers and the regulatory system are external mechanisms.

Generally, corporate governance mechanisms are based on market-driven and regulatory institutions that discipline corporate decision-making. Market-driven mechanisms include the very fundamental product and factor markets that the corporation operates on; as Jensen (1993) writes, firms that are unable to match market needs at competitive prices are bound to fail. Also capital market mechanisms (Roe, 2004), such as asset valuation and market for takeovers, are used to monitor efficient deployment of firms' resources, provide funding for new projects at appropriate cost, and reallocate assets to better use when necessary. Nonetheless, in addition to market mechanisms, corporate governance is to some extent regulated by authorities basically in every nation. Given that there should be natural incentives for corporations to promote good governance, Becht et al. (2002) ask why governance regulating should take place at all. The authors identify two reasons that justify governmental regulating. First, self-regulating by shareholders is likely to favour some parties and thus end up

inefficient from the overall point of view. Second, shareholders may be dispersed with small individual stakes and thus, if needed, changing governance regulations later can be difficult. Roe (2004) also mentions the importance of information disclosure and regulations' role in this. Information is crucial to effective market pricing of equities and functioning of corporate governance mechanisms. Minimum standards of corporate information disclosure are typically defined in various legal acts that regulate for instance securities markets and accounting.

Hereby, market-based and regulatory mechanisms perform somewhat different tasks in the overall corporate governance framework, but they also complement each other in many respects. Roe (2004) considers that the two types of mechanisms suit to counter different aspects of corporate governance problems. Market mechanisms are better in guiding managers to make their personal effort for the shareholders' best, an area that cannot be effectively dealt with explicit regulation. Regulation in turn can be employed to counter diversion of various private benefits from the corporation, where market mechanisms may prove inadequate. An illustration on the different natures of market-based and regulatory mechanisms is provided by Jensen (1993), who writes that legal liabilities on boards are better in limiting the potential downside risk rather than maximizing the potential upside outcome.

Finally, Roe (2004) notes that some corporate governance mechanisms may be set up or influenced by the needs to deal with external governance issues. For instance, employee representation in the board of directors is an example how governance mechanisms take account of parties other than only shareholders.

2.4 Corporate governance around the world

In the recent past, corporate governance has gained attention across the globe for instance due to privatization of previously state-owned corporations, enhanced merger and takeover activity, and integration of international capital markets. Furthermore, internationally increased flow of household savings into pension and mutual funds has given the institutions in control of these funds a major role on capital markets. All these phenomena have increased the importance of public stock markets to national and

international economies, and thereby attention has been drawn to governance principles and practices on the market. In the 1990s, several governments such as the USA, the UK and France examined their national circumstances for corporate governance (Weimer and Pape, 1999). On the other hand, also some serious failures of governance systems in both emerging markets and developed markets have prompted efforts to build more reliable corporate governance frameworks. (Becht et al., 2002)

The importance of corporate governance has recently been addressed also in high-level policy setting. The OECD issued in 1999 and revised in 2004 "The OECD Principles of Corporate Governance" to be used as an international, non-binding reference for local policy makers and other parties in setting and guiding corporate governance practices. The OECD recognizes corporate governance to affect financial market stability, economic growth, companies' competitiveness, and the welfare of a growing number of people, as private institutions' role is becoming increasingly central in modern societies. Furthermore, the OECD considers sound corporate governance environment to be important for nations to attract increasingly internationally mobile capital, and help to lower the cost of capital. (OECD, 2004)

Doidge et al. (2007) provide empirical evidence that national circumstances matter for firms' corporate governance. The authors examine how much firm-specific and country-specific variables explain firms' corporate governance ratings. The study uses firm-level governance ratings by Credit Lyonnais Securities Asia (CLSA), Standard & Poor's (S&P), and FTSE ISS (ISS) as dependant variables. Importance of various firm- and country-specific variables to governance ratings is estimated with regressions. With all rating systems, country variables were better than firm variables in explaining variation of governance scores.

It is apparent that the level and practice of corporate governance vary across the globe. However, there is not likely to be a universal code for good corporate governance practices, as encompassed by the OECD Principles (2004): Due to differences in local conditions and political forces (Roe, 2004), the roles of different parties in corporate governance mechanisms vary across countries. Thereby, a general model for proper

governance hardly is feasible, but common underlying principles can still be found. (OECD, 2004)

Instead of approaching corporate governance from the same viewpoint across the globe, it can be useful to distinguish between various *systems of corporate governance* that can be found internationally (Reaz and Hossain, 2007). Weimer and Pape (1999) define a system of corporate governance as "a more-or-less country-specific framework of legal, institutional and cultural factors shaping the patterns of influence that stakeholders --- exert on managerial decision-making." Thereby, with the addition of country-specificity, the definition for a system of corporate governance largely resembles that of corporate governance in general as presented earlier. In practice, however, there are major differences in the forms and roles of different corporate governance institutions across nations (Moerland, 1995).

Moerland (1995) provides a high-level division of corporate governance systems into market-oriented systems and network-oriented systems. Market-oriented systems, i.e. those of Anglo-Saxon nations, are characterised by relatively disperse share holdings that pronounces separation between ownership and control. To deal with the resulting agency problems, corporate governance is primarily based on extensive and effective equity markets. Corporate takeovers, also referred to as "market for corporate control," and labour market for switching managers are important corporate governance mechanisms. Fundamental distinctions are made between providers of equity and debt capital. In network-oriented, that is, Germanic, Latin and Japanese systems, corporate governance is based on relatively concentrated and long-term investments. Close banking and corporate relationships have tended to dominate supervision of governance over the market for corporate control. In contrast to the Anglo-Saxon practice, banks have also held large equity stakes in corporations. In addition, significant family and state holdings in corporations have been common in nations with network-oriented systems. (Moerland, 1995)

Due to different ownership structures, legislations and considerations on what is the objective of the corporation, for instance, the nature and importance of different

corporate governance mechanisms varies between the systems (Moerland, 1995). Reasons for differences in the two systems can be related to the above discussion on shareholder and stakeholder views on corporate governance, as well as various corporate governance mechanisms. It is likely that local underlying cultural, political and regulatory environments have had fundamental influence on what type of approach to corporate governance has been adopted in each nation.

As it has not been possible to spell out a universally applicable formula for optimal corporate governance, the best system can hardly be named either. Moerland (1995) says that neither the market-oriented nor the network-oriented system can be argued to be better, as both types of arrangements have remained over time. Moreover, both systems have pros and cons that often are effectively tradeoffs between the two approaches (ibid). Similarly, Shleifer and Vishny (1997) note that the most successful economies in the recent history, e.g. the USA, Germany, and Japan, have all been based on different types of corporate governance arrangements.

However, Shleifer and Vishny make a broad statement that good corporate governance systems generally feature some combination of large holdings and legal investor protection. Concentrated share holdings seem to occur across the globe, while less performing corporate governance systems often lack appropriate legal provisions for investor protection. Shleifer and Vishny suggest that some extent of legal protection is a precondition for a performing corporate governance system. Weimer and Pape (1999) in turn consider that some degree of convergence between the market-oriented and network-oriented systems is taking place in the world, potentially reflecting an attempt to use advantages of both systems. This notion is in accordance with Jensen's (2001) approach presented earlier, that suggested "enlightened value maximization" and "enlightened stakeholder theory" as a sort of crossroads between shareholder and stakeholder approaches to corporate governance.

2.5 Corporate governance in Finland

2.5.1 Development of corporate governance in Finland

Overall, in the recent history corporate governance in Finland has shifted towards the Anglo-American model (Ylä-Anttila et al., 2004). The Finnish legal system overall was highly qualified already in the early 1980s, but corporate governance legislation was less advanced and financial markets were restricted by strict regulations. Deregulation took place in the 1980s as changes in underlying national economic conditions caused the financial system to become outdated. However, until the 1989 Securities Market Act there was no legislation dedicated to the securities market, and for instance disclosure of information was addressed in the Helsinki Stock Exchange self-regulation from 1985. Also the 1978 Companies Act was not substantially revised during the 1980s, and the Finnish accounting system at the time was poorly complaint with international standards. In the 1990s, the Companies Act and the Securities Market Act, as well as accounting and auditing regulations were substantially amended and changed. Part of these changes related to Finland joining the European Union in 1995 and consequent integration with EU practices. (Hyytinen et al., 2003)

In the past Finland's financial markets were dominated by banks that was result from combination of regulation, taxation, and monetary policies (Hyytinen et al., 2003). Hyytinen et al. (2003) show empirically that at the beginning of the 1980s creditors were better protected than shareholders, but by the year 2000 this situation had reversed, however, so that the net change in the overall level of investor protection was found positive. Competitive position of banks was impacted first by deregulation of financial markets during the 1980s and then by the severe financial crisis in the early 1990s (ibid) that was followed by an economic recession. Prior to the recession, ownership of Finnish corporations used to be centred to banks, and also cross-ownerships between companies were common (Pajarinen and Ylä-Anttila, 2006) until dispersed ownership structures became more prominent during the 1990s. State holdings were being sold to private investors (Ylä-Anttila et al., 2004), capital markets gained control, and information transparency of listed companies improved. There has been clear move away from debt financing in favour of stock market based financing, and financial

institutions' ownership stakes in corporations have decreased towards the end of the 1990s, while foreign holdings have increased (Hyytinen et al., 2003). (Tähtinen and Kivinen, 2002)

Interest in and transformation of Finnish corporate governance is also to some extent a result of international investors' increased influence on the Finnish capital market. Restrictions on foreign equity ownership were completely removed in 1993 upon the beginning of Finland's EEA membership (Ylä-Anttila et al., 2004). As a part of changes in the financial markets structure, in the 1990s significant amount of holdings were transferred from Finnish institutions to foreign investors (Pajarinen and Ylä-Anttila, 2006). By 2002, foreigners, mostly institutional investors, held some 60-70% of the total Finnish market capitalization (ibid). Changes in the financial markets structure coincided with the post-recession economic growth and restructuring that pronounced needs for new forms of financing (Ylä-Anttila et al., 2004). Foreign investments in Finland were consciously promoted after recession and also Finnish firms became more active in foreign capital markets (ibid). (Tähtinen and Kivinen, 2002)

Changes in the financial markets and corporate ownership structures had important impacts on corporations' governance, generally towards emphasis on shareholder value (Pajarinen and Ylä-Anttila, 2006). As for board structures, there has been movement from dual systems into single tier boards. Supervisory boards have existed in some state-controlled and large corporations. However, for the time being supervisory boards are not that many and rather the trend has been towards removing them (Sotka and Vuori, 2001). Furthermore, in the past company executives, customer representatives, and creditors used to hold board positions in corporations, but more recently there have been increasing numbers of independent directors that have capabilities relevant to the firm. Regarding corporations' objectives, more attention has been placed on identifying core businesses and increasing shareholder value (Ylä-Anttila et al., 2004). (Tähtinen and Kivinen, 2002)

2.5.2 Legislation on corporate governance in Finland

The Finnish Limited Liability Companies Act forms the basis for corporate governance regulations in Finland and it is applied to both public and other corporations. Also the Accounting Act, the Auditing Act, and other accounting legislation affect corporate governance practices in all corporations. In addition, publicly listed corporations are subject to the Finnish Securities Market Act, regulations by the Finnish Financial Supervision Authority (FIN-FSA), and the rules of the Helsinki Stock Exchange. As for shareholder rights, the most important provisions are in the Companies Act and in the Securities Market Act (Hyytinen et al., 2003). (Tenhunen, 2005)

According to Tähtinen and Kivinen (2002), it is to be noted that in Finland legislation defines several issues that in many other nations are addressed in corporate governance codes. Tähtinen and Kivinen consider that two corporate governance codes exist in Finland: (1) the Corporate Governance Recommendation for Listed Companies (2004) from the Helsinki Stock Exchange, the Finnish Central Chamber of Commerce and the Confederation of Finnish Industry and Employers, and (2) Handling the Corporate Governance Issuers in State-Owned Companies and Associated Companies (2000) from the Finnish Ministry of Trade and Industry.

The Corporate Governance Recommendation for Listed Companies from 2004 replaced the earlier recommendation that was given in 1997 (Tenhunen, 2005). Companies listed in the Helsinki Stock Exchange must either comply with the Recommendation or explain deviations from it. Thereby, the Recommendation in effect complements legislation on public companies (ibid). The Recommendation covers areas that are central to corporate governance, such as general meetings, boards, and insider administration. The full contents of the Recommendation are shown in Attachment 1. The Recommendation is administered by the Securities Market Association that takes part in issuing and interpreting self-regulations on limited liability companies (the Securities Market Association website).

There is also so-called Helsinki Takeover Code was published in December 2006. The Code guides practices in public takeovers in Finland and it is meant to complement

applicable legislation. The Code is maintained by the Securities Market Association. (The Securities Market Association website; Recommendation Regarding the Procedures to be Complied with in Takeover Bids (Helsinki Takeover Code))

2.6 Summary of corporate governance theory

This chapter introduced theory on corporate governance. We first showed how agency problems in corporations underlie the general framework of corporate governance. We then introduced shareholder and stakeholder viewpoints as alternative approaches to corporate governance. This illustrates that there are different understandings on how corporate governance should arranged, although shareholder based viewpoint has gained ground in the recent past. We continued to demonstrate how corporate governance problems in firms can be encountered with different corporate governance mechanisms, both internal and external to the firm. Finally, we overviewed how corporate governance practices differ across the globe, and gave a briefing on recent development of the Finnish governance environment.

In conclusion, this chapter placed boards of directors as one mechanism into the broader framework of corporate governance institutions. As the issues and practices of corporate governance may differ across firms and nations, also the roles of various governance mechanisms such as boards depend on the particular context. In the next chapter, we will take a more detailed look into the board of directors as a corporate governance mechanism.

3. Board of directors as a corporate governance mechanism

3.1 Duties of the board

Jensen (1993) condenses that the board, as the head of corporation's internal governance, has the ultimate responsibility for the firm's performance. Accordingly, the two key duties of the board are monitoring the CEO, and steering the corporation by taking a role in major decisions. The same put in an alternative manner, Murphy and McIntyre (2007) write that the board's value is based on its capability in both controlling for negative managerial behaviour as well as promoting commitment of corporate resources into positive undertakings. These two tasks translate into the two dimensions of the total agency cost: An active component that is the cost of managerial self-dealing, and a passive component that consists of an opportunity cost from failure to take on profitable business. The board should be geared to handle both dimensions, which however may set differing requirements to the board's structures.

The board's function as an independent organizational body that disciplines the corporation's activities is pronounced in the absence active investors with significant equity or debt stakes to watch the corporation closely (Jensen, 1993). As explained previously, disperse investors are often too uninformed and not motivated to effectively supervise or control important decisions in the corporation. Becht et al. (2002) write that the board's effectiveness, particularly in its role towards the CEO, has been frequently questioned. They provide a number of reasons that may cause board's role in practice differ from that by definition. First, the board ought to be an independent body in the corporation, but in effect the CEO may have a substantial say in the election of board members. Second, there is potentially significant informational asymmetry on the corporation's affairs to the CEO's advantage. Third, board members regularly do not have major wealth stakes in the corporation. Finally, directors may not feel comfortable with confronting the management, but rather act in a consultative manner.

Similarly, Jensen (1993) argues that to the date few boards had carried out their duties without some crisis first encountering the corporation. To account for boards' ineffectiveness, Jensen discusses the following reasons:

- Soft board culture that misses appropriate criticism;
- Directors' insufficient information on the corporation's affairs;
- Lack in directors' financial understanding;
- Inadequate, mostly regulation-based board incentives that do not support value creation;
- Lack of board members' equity ownership;
- Oversized boards that are inefficient and get controlled by the CEO;
- Suggestions to make board processes overly democratized so that all stakeholders are involved in exercising control; and
- CEOs who occupy simultaneously chairman of the board seat.

While Jensen does not call for constant board intervention in the corporation's affairs, he argues that directors should exercise internal control before this is forced by external control mechanisms, such as product or capital markets.

The board's role and required characteristics inevitably must vary according to the conditions particular to the organization in question. One of the early attempts to place board characteristics in context with firm-specific conditions was made by Pfeffer (1972), who studies how board size and composition relate to the organization's interdependencies with its environment and other organizations. Pfeffer writes that an organization can survive primarily by improving internal efficiency or through ensuring favourable relations with external organizations, and boards are used to deal with important external organizations. Pfeffer finds supporting evidence with empirical tests, and concludes that board size and composition are related to the organization's external environment.

Morck et al. (1989) provide evidence that activities taken by boards vary with surrounding industry conditions and management characteristics. Morck et al. begin from the condition that monitoring and possible replacement of top management is the board's central duty, and they treat hostile takeovers as the alternative corporate governance mechanism in the absence of actions by the board. Using a sample of 454 Fortune 500 corporations in 1980, the authors track takeovers and management changes

between 1981 and 1985. They find that complete management turnover, signalling board activity, became more likely when the firm significantly underperformed its industry benchmark. However, when also the entire industry performed poorly, hostile takeovers emerged as a more prominent control mechanism than boards. Also, management replacement without a takeover was less likely in companies ran by a founding family member, or when a single executive dominated the company's management. Moreover, when the controlling manager was relatively younger (less than 60 years of age) the likelihood of a hostile takeover rose, while the probability of manager replacement without a takeover declined.

3.2 Prior empirical research on board structures

In the following, we will review some earlier research on boards of directors. Here, the presentation of prior studies is divided into those on board composition, board size, CEO influence, and director characteristics. This division is to some extent technical, as several studies consider more than one of these topics in a single paper, and thereby similar references appear across the sections. However, we make the distinction here to give a clearer picture on how different aspects of board structures have been approached in empirical research.

3.2.1 Studies on board composition

Generally, boards of directors can be divided into inside and outside members, or independent and non-independent members. Inside members are directors that are employed by the company, while outside members are non-employees. Inside directors are automatically non-independent of the company, while outsiders may also be non-independent in case they have significant interests tied to the company, such as major ownership stakes. Criteria for director independence may be defined in the applicable corporate governance code, for instance. The division between inside and outside directors, or independent versus non-independent directors, is generally referred to with the concept of board composition.

Determinants of board composition have been studied subject to the firm's internal characteristics and external environment. With a sample of 583 listed US firms in 1983 and data across 10 years, Denis and Sarin (1999) find that the proportion of independent

directors related positively to firm size, while increase in the proportion of independent outsider directors was associated with greater leverage and board size. Furthermore, firms with a founder as a top executive, or those companies with greater growth opportunities had smaller proportions of outsider directors. Also insider ownership interrelated negatively with the proportion of independent outside directors.

With a sample of all IPOs of industrial firms in the US in between 1988-1992, Boone et al. (2007) find that the fraction of independent outside directors increases with firm complexity, as measured with firm size, firm age, and the number of segments. In contrast, increased monitoring costs, as measured with market-to-book ratio, lead into smaller fraction of independent directors. Boone et al. do not find the expected positive relation between board independence and potential for managers to extract private benefits from the firm, as measured with free cash flow, industry concentration, and potential to avoid takeovers that would reflect need for firms to introduce greater monitoring. In a similar examination with a sample of almost 7000 firms, Linck et al. (2008) confirm the positive relation between free cash flow and board independence, as well as the negative relation between independence and market-to-book ratio. Coles et al. (2008) do not find relation between insiders and free cash flow, but consistent with the above report that larger firms have more independent boards. Coles et al. (2008) also find that insider fraction in the board increases with the proportion of intangible assets and the firm's risk, as measured with volatility of excess returns.

Li (1994) studies the relationship between ownership structure and board composition with a sample from 10 countries in 1987. The proportion of outside directors was found to relate negatively to ownership concentration and large ownership stakes by banks, but positively to large holdings by the state. In line with Denis and Sarin (1999) in the above, larger firms were found to have higher proportions of outsider directors. However, controlling for firm size, larger boards had smaller proportions of outsiders. In contrast, CEO and chair positions held by the same person resulted into a greater proportion of outsiders. Finally, the relationship of board composition to the proportion of foreign sales was curbed, so that the proportion of outsiders was at the lowest when the share of foreign revenue was just under 50%.

An example of linking board composition with the firm's external environment is provided by Pfeffer (1972). Using a random sample of 80 corporations, Pfeffer finds that the proportion of insider directors related negatively with existence of local and national regulation on the organization. Furthermore, based on a regression equation estimated from the sample, Pfeffer also finds that deviations from the expected proportion of insiders related negatively with firm performance.

In addition to the determinants of composition, other studies have examined the effect of board composition to the firm. Hermalin and Weisbach (1991) use a sample of 142 NYSE firms to examine the effect of board composition and ownership structure on firm performance. Board composition could not be associated with firm performance, while top management ownership related positively to performance at low levels, but negatively at higher levels. Baysinger et al. (1991) study the effect of board composition on the firm's R&D spending with a sample of 176 Fortune 500 companies in 1980. Findings tell that the proportion of inside directors has a positive effect on the firm's R&D expenditure. In contrast, using a sample of more than 6500 firm-year observations in between 1992-2001 from Compact Disclosure and Investor Responsibility Research Center (IRRC), Coles et al. (2008) test the link between the firm's R&D intensity and the fraction of inside directors, but do not find a positive relation. Similarly, using considerable sample sizes, Boone et al. (2007) and Linck et al. (2008) do not find that high R&D spending would relate positively with insider representation in the board. However, it should be noted Coles et al. (2008) also extend the analysis with the hypothesis that in R&D intensive firms, greater insider fraction drives higher firm value, and this expectation does receive support from their empirical evidence.

Finally, there are also some more dynamic studies on impacts and evolution of board composition. Weisbach (1988) uses a sample of 367 NYSE companies to study if inside and outside directors act differently in removing firm's top management following poor firm performance. Results suggest that outsider dominated boards were significantly more likely to dismiss the CEO based on firm performance measures than insider dominated boards. Using a sample of 142 NYSE-listed companies with data from

between 1971-1983, Hermalin and Weisbach (1988) study the effects of firm performance, CEO tenure, and changes in market structure on changes in board composition. Hermalin and Weisbach find that in the years around CEO change, inside directors join and depart the board. According to the authors, this may imply that the new CEO is selected from among inside directors. Unsuccessful inside directors consequently tend to leave the board and their vacancies are filled in with outside directors. Poor firm performance was found to lead into departure of insiders and addition of outsiders. This pattern also takes place upon firms leaving industries, which can naturally be associated with poor performance, as Hermalin and Weisbach note. Linck et al. (2008) support Hermalin and Weisbach in that poor performance leads into more outsider representation, as they find a negative relation between board independence and firm performance. Coles et al. (2008) also report a positive relation between insider fraction and profitability.

3.2.2 Studies on board size

Along with board composition, board size is another major subject addressed in prior research on boards. In effect, board size is often studied together with board composition, and the two topics link together in many respects.

As for determinants of board size, Pfeffer (1972) finds board size to relate positively to the organization's sales volume and debt-to-equity ratio, that is, need for external capital. Denis and Sarin (1999) also report board size to relate positively with firm size, leverage, and the proportion of independent outsiders. Furthermore, Boone et al. (2007) find that board size relates positively with the firm's scope of the operations, as measured with firm size, firm age, and the number of segments. Linck et al. (2008) confirm that firm size, the number of segments, firm age, and also leverage relate positively with board size. Boone et al. also find evidence that the potential for managers to extract private benefits from the firm, as measured with free cash flow, industry concentration, and potential to avoid takeovers, leads into larger boards that reflects the authors' hypothesis for greater need of monitoring in such firms.

In turn, Denis and Sarin (1999) find firms with greater growth opportunities, as measured by the industry's median market-to-book ratio, to have smaller boards. Boone et al. also find that the firm's growth opportunities, as measured with R&D intensity, and also volatility of returns lead into smaller board sizes. The authors' related hypothesis is that the firm's growth opportunities and risk increase costs of monitoring and thereby lead into smaller boards. Using similar reasoning, Linck et al. find that market-to-book ratio and stock return volatility relate negatively with board size. However, Linck et al. do not find the predicted negative relation between board size and the firm's R&D expenditure.

Evidence on a negative relation of board size to firm value is presented by Yermack (1996). Yermack uses sample of 452 large US Forbes 500 corporations with data from between 1984-1991, and finds a negative effect on firm value with increases in board size. The largest loss in value occurs when boards grow from small to medium size. In arriving at the result, Yermack controls for firm size, industry, board composition, inside stock ownership, the firm's growth opportunities, diversification, firm age, and various corporate governance structures. Board size also does not seem to be a product of prior firm performance.

Eisenberg et al. (1998) provide further evidence that large boards lead into decreasing firm value with a sample of 785 healthy and 94 bankrupt, mostly small and mid-size Finnish corporations drawn from the period 1992-1994. The authors find a negative relation between board size and industry-adjusted return on assets. Results imply that a negative effect of board size on profitability can take place even in absence of separation of ownership and control characteristic for larger companies.

Coles et al. (2008) provide some alternative insights into examining the effect of board size on firm value. First, Coles et al. show that board size empirically depends on whether the firm by nature is simple or complex. The firm's complexity was measured with a factor score that was constructed of the log of sales, leverage, and the number of segments. For complex firms, boards were found to be larger, and this additional size was typically made by outsider directors. Second, Coles et al. demonstrate that Tobin's

Q increased with board size in complex firms. These findings imply that, given certain firm characteristics, larger boards may increase firm value.

Reviewing research on boards, Hermalin and Weisbach (2003) summarize that smaller boards have generally been demonstrated to do better on firm performance measures. Hermalin and Weisbach write that the idea behind this logic is that free-rider problems increase as the board gets more crowded. However, as the authors note, in case the value-decreasing effect of large boards seems so evident, why have market mechanisms not revised oversized boards? Coles et al. (2008) suggest transaction costs on changing board size as a reason that boards may not smoothly adjust towards the optimum. For instance, the selection process of board members, relationships, lack of proper director candidates, and costs of hiring or firing a director can hinder quickly altering board size.

3.2.3 Studies on CEO influence in the firm

As stated in the opening of this chapter, the other fundamental duty of the board is to monitor the firm's CEO or top management in general. The CEO occupies a crucial position managing and influencing many of the company's major decisions. Often, the CEO also has significant holdings in the firm, holds a seat in the board of directors, and has influence on nomination of other directors. What is more, motivations of the CEO on how to run the firm might be essentially different from those of shareholders or the board that represents the owners of the company. The balance of influence and conflicts in the relationship between the CEO and the board importantly affect the board's role and effectiveness (Hermalin and Weisbach, 2003). Hermalin and Weisbach (2003) write that the central question on board's independence from the CEO has effectively been underlying also many studies on board size and board composition. Consequent on the above, while examining boards of directors and corporate performance, considering the also impact of the firm's CEO appears relevant.

An example of relating CEOs and firm performance is provided by Adams et al. (2005). Adams et al. use data on Fortune 500 firms between 1992-1999 to test the relationship between the degree of CEO power and the variability of firm performance. Measuring CEO influence on decisions, the authors use variables for whether the CEO is a founder

of the company, the only insider in the board, and whether s/he also holds the chairman and president titles in the firm. When the CEO was a founder of the firm, there was a significant and positive effect on both Tobin's Q and ROA. The other two variables on CEO influence produced mixed or no relation to the firm value. Adams et al. find that variability in firm performance increases with the power of the CEO, particularly when the CEO is a founder of the company. Adams et al. also examine the relation of performance variability to the CEO's role in the selection of directors. CEO influence is considered higher in case the CEO sits in the board's nomination committee, or the board does not have a nomination committee. However, no effect on performance variability could be demonstrated testing this variable.

Hermalin and Weisbach (1991) write that agency problems are influenced by the length of board and CEO tenures. Long CEO tenure, that is, absence of CEO dismissal, could signal low agency problems. However, long CEO tenure could also be counterproductive in the sense that the manager is too dominant, or loses responsiveness. Their empirical evidence supports that, beyond a certain point, long CEO tenures are associated with deteriorating firm performance.

Shivdasani and Yermack (1999) examine CEO's influence on board member selection. Using Fortune 500 companies from 1995 as the sample, and data over the period 1994-1996, Shivdasani and Yermack find that when the CEO is sitting in the firm's nomination committee, or the firm has no nomination committee involved in director selection, there is tendency towards fewer independent outside directors being elected to the board.

Boone et al. (2007) also address the link between CEO influence and board composition. They use measures for insider influence and constraints on insider influence to explain the fraction of independent directors in the board. Empirical evidence suggests that increased insider influence, as measured with CEO tenure and CEO ownership leads into smaller fraction independent directors in the board. In turn, constraints on insider influence, as measured with outside director ownership, presence of venture capital, and the reputation of the lead underwriter of the firm's IPO, lead into

greater board independence. Boone et al. also report a negative relation between CEO ownership and board size.

Linck et al. (2008) find similar results that higher managerial ownership relates negatively with board size and independence. The authors suggest that this may either imply greater insider influence, or that managerial incentives are alternative mechanisms for board monitoring. Results of Coles et al. (2008) also suggest a positive relation between CEO ownership and the fraction of insiders.

3.2.4 Studies on director characteristics

Apart from general board structures, such as size and composition presented above, some authors have looked into more detailed characteristics of individual directors. Recently, for instance presence of female, foreigner, and minorities in boards have been studied. In the following we provide a few examples on recent research on director characteristics.

Randøy and Oxelheim (2003) studied how Anglo-American directors affect firm value in a sample of 253 listed Norwegian and Swedish firms. Empirical tests imply that Anglo-American board membership related positively to foreign ownership, foreign stock exchange listing, the firm being a foreign subsidiary, blockholder ownership, and importantly firm value as measured with Tobin's Q. In turn, the relation to board independence was found negative. Finally, the authors also show that CEO turnover following poor financial performance seems to be higher in firms with Anglo-American directors.

Some studies have attempted to develop understanding on board diversity. An example is the examination of diversity in Scandinavian boards by Randøy et al. (2006) that was introduced in the opening of this paper. Diversity of directors, as measured with gender, nationality, and age related most to firm size and industry. Neither positive nor negative relation to firm performance measures was found.

Carter et al. (2003) studied board diversity in a sample of 638 Fortune 1000 firms with data from 1997. Board diversity, as measured with the proportion of female and ethnic minorities in the board, was found to have a positive effect on Tobin's Q. As for determinants of diversity in the board, Carter et al. find that diversity increases with firm size, but decreases with the proportion of insiders in the board. Presence of female and minorities in the board were also found to relate positively to each other.

3.3 Summary on background literature on boards

This chapter examined boards of directors as a corporate governance mechanism. We first established that by definition the board is the head of the firm's internal governance, and assumes the important responsibilities of monitoring the firm's top management, as well as advising the firm in crucial decisions. We then reviewed some prior empirical research on boards that for the most part seeks to examine the board's effectiveness in its monitoring and advisory tasks, ultimately affecting the firm value.

Existing empirical research on boards implies that board structures vary with firm's operational and governance characteristics, most likely in order to respond to firm-specific monitoring and advisory requirements. Although findings across different studies to some extent are not consistent, empirical results on significant sample sizes suggest that board structures adjust according to particular business and governance contexts. Next, based on earlier research and models, we set hypotheses for our own empirical testing on determinants of board structures.

3.4 Hypotheses for empirical testing

The hypotheses and regression models used in our empirical research are largely based on previous works by Boone et al. (2007) and Coles et al. (2008). These authors make noteworthy efforts in bringing together many various aspects to determinants of board structures under a limited number of testable hypotheses. In practice, our set of data is less comprehensive than that used by Boone et al. and Coles et al. in their studies, so we will reduce the scope of the models as far as applicable to our sample. We will also do some adjustments and additions of our own to the models.

Table 1. Hypotheses for empirical research

The table describes the expected relations of board structures to firm characteristics, and firm value. *Board size* is the number of directors in the board. *Fraction independent* is the percentage of independent directors in the board, as stated by the company. *Female presence* is a dummy set equal to one if there is a female director in the board. *Foreigner presence* is a dummy set equal to one if there is a foreign director in the board. *Firm size* is the natural logarithm of the market value of the firm's equity at the end of 2006. *Firm age* is the number of years since the firm's IPO. *Number of segments* is as reported by the firm according to IFRS. *Internationality* is a dummy set equal to one if the firm reports at least 50% of its sales from overseas, or reports Finnish sales as part of a broader geographic segment. *Market-to-book* is market value of equity plus book value of debt, divided by total assets. *R&D intensity* is a dummy set equal to one, in case the firm's R&D spending over total assets ranks within the 75th percentile of the sample. *Risk* is volatility of the firm's share price. *CEO tenure* is the number of years the present chief executive officer has served in the position. *Nomination committee* is a dummy equal to one if the firm reports having a nomination committee. *COMPLEXITY* is a score with values in between zero and one, increasing in quartiles if the firm is above the sample's median in ln(Market value), Firm age, or Number of segments, or the Internationality dummy is set equal to one.

	Board size	**Fraction independent**	**Female presence**	**Foreigner presence**
Scope of the operations hypothesis				
Measures for scope of the operations				
Firm size	+	+	+	+
Firm age	+	+	+	+
Number of segments	+	+	+	+
Internationality	+	+	+	+
Monitoring hypothesis				
Measures for monitoring costs				
Market-to-book	-	-		
R&D intensity	-	-		
Risk	-	-		
Negotiation hypothesis				
Measures for insider influence				
CEO tenure		-		
Measures for constraints on insider influence				
Nomination committee		+		
Effect on value in firms with higher				
COMPLEXITY	+			
R&D intensity		-		

The hypotheses set for our empirical work are summarized in Table 1, which is largely adopted from Boone et al. In the first stage of the empirical research, we test how board structures relate to firm-specific operational and governance environments. For different board structures, we will include board size, board composition, presence of female directors, and presence of foreign directors. As our empirical model, we will use the three hypotheses developed by Boone et al. that they used to examine determinants of board size and composition: *Scope of the operations hypothesis* suggesting board structures are products of scope and complexity of the firm's operations; *monitoring hypothesis* implying that board size and composition are affected by business and information environments particular to the firm; and *negotiation hypothesis* that predicts board composition depends on negotiations between outside directors and the firm's CEO. In the second stage of our empirical study, we will test the relation of board size and composition to firm value. The hypotheses and the empirical method to this part are

borrowed from Coles et al. (2008), who studied the relation of board size and composition to firm performance, with consideration to firm-specific information needs.

In the following, we will review the argumentation that underlies the hypotheses summarized in Table 1. In their papers, Boone et al. and Coles et al. present considerable amount of prior research to reason their hypotheses, and we regret not being capable of providing such fundamental argumentation here. Instead, we will rather refer directly to the studies that we use as our models.

3.4.1 Scope of the operations hypothesis

Scope of the operations hypothesis implies that board structures respond to the scope and complexity of the firm's operations. Boone et al. (2007) and Coles et al. (2008) predict and empirically support that board size and the fraction of independent directors increase with the firm's complexity. Coles et al. reason that more complex firms have greater advisory needs. Argumentation and empirical results by Linck et al. (2008) are similar with the above. Hereby, we hypothesize that board size and independence increase with scope of the operations.

In addition to the predictions on board size and composition, we extend scope of the operations hypothesis with two more board characteristics, female and foreigner presence. We hypothesize that also the presence of female and foreign directors in the board relates positively with scope of the operations. This would be in line for instance with Randøy et al. (2006), who found that larger Scandinavian companies had higher proportions of female and foreigner directors.

3.4.2 Monitoring hypothesis

Boone et al. (2007) write that the board structure may be affected by the particular monitoring conditions, that is, potential for managers to extract private benefits from the firm, and costs of monitoring in the firm. Lacking appropriate data, we omit consideration of private benefits, but we will test the hypothesis regarding costs of monitoring. Boone et al. explain that the cost of monitoring rises in firms with higher growth opportunities, as well as in firms with more risk. Thereby, in these circumstances larger boards and outside directors are less likely to be effective

monitors. Similarly, Coles et al. (2008) hypothesize that the importance of firm-specific information in the board should be reflected in a higher proportion of inside director representation. According to Boone et al., we predict that the firm's growth opportunities and risk to relate negatively both with board size and the proportion of independent directors.

3.4.3 Negotiation hypothesis

The third hypothesis by Boone et al. (2007) is based on the assumption that the CEO may be influential in the firm, and thereby be able to affect also board composition. Previously, we also presented some empirical evidence on CEO influence. Boone et al. predict that board independence relates negatively with insider influence, and positively with constraints on insider influence. For instance, insider influence increases with the CEO's ownership stake in the firm, and decreases with the presence of a recognized institutional stakeholder. Consistent with Boone et al., we hypothesize that board independence decreases with higher insider influence, and increases with more constraints on insider influence.

3.4.4 Board size, board composition, and firm value

The final part in our study tests if there is a relation of board size and board composition to firm value, given the firm's particular information needs. In carrying out this test in practice, we rely on the model developed by Coles et al. (2008). Coles et al. studied the effects of board size and composition to firm performance, subject to complexity of the firm, and the level of the firm's R&D spending over total assets. The idea behind examining board size and composition in context with the firm's complexity and R&D intensity is that boards may be required to have different kinds of information, depending on the particular firm characteristics. Complex firms, due to their wider scope of operations, in general are assumed to need more advisory that is enabled by larger boards and outside directors. In contrast, in R&D intensive firms the required information is likely to be highly firm-specific and thereby held mostly by the insiders of the firm. In consequence and according to Coles et al., we hypothesize that board size increases value as the firm's complexity increases. Correspondingly and further according to Coles et al., we hypothesize that the fraction of non-independent directors increases value as the firm's R&D intensity rises.

4. Empirical methods

4.1 Overview of research design and methodology

The empirical research is divided into two stages. First, we will test determinants of board structures, conditional to business and governance environments particular to the firm. Second, we will attempt to link board size and composition with firm value, with consideration to the company's need for certain type of board knowledge.

In both stages, we will use ordinary least squares (OLS) multivariate regression method. In all regressions, we will use (n-1) industry dummies to control for industry-specific effects. We choose the industry with most companies in the sample as the reference category (Dougherty, 2007, p.179-180), and omit it from the set of dummy variables. In addition to industry dummies, we will use control variables particular to the model in question. Control variables are largely derived from the previous studies that we use as our models. Regressions are done with SAS Enterprise Guide 4 software.

4.2 Sample group

Data to the study was retrieved from companies that were listed to the OMX Helsinki Stock Exchange in 2007. By common practice, companies that operate in the financial sector were excluded from the sample. Also companies that were merged, acquired, or otherwise restructured in 2007 were left out. Finally, companies that were subject to events that are highly unusual from the normal course of business were not included to the sample. The total number of companies in the final sample was 107. Table 2 and Table 3 present the companies included and excluded from the sample group, respectively. Table 4 summarizes the sample by industries and firm size.

Table 2. Companies included into the sample group

The sample group includes all companies that were listed to the OMX Helsinki Stock Exchange for the full year 2007, and during the year were not (1) classified as Financials on the OMX list, (2) acquired by another company, (3) restructured, or (4) subject to some other, highly exceptional events.

Company name		
Affecto Oyj	Incap Oyj	Rautaruukki Oyj
Ahlstrom Corporation Oyj	Ixonos Oyj	Raute Oyj
Aldata Solution Oyj	Kemira Oyj	Rocla Oyj
Alma Media Oyj	Keskisuomalainen Oyj	Ruukki Group Oyj
Amer Sports Corporation	Kesko Oyj	Salcomp Oyj
Aspo Oyj	Kesla Oyj A	SanomaWSOY Oyj
Aspocomp Group Oyj	KONE Oyj	Scanfil Oyj
Atria Group Oyj	Konecranes Oyj	Solteq Oyj
Basware Oyj	Larox Oyj	SSH Communications Security Oyj
Beltton-Group Plc	Lassila &Tikanoja Oyj	Stockmann Oyj Abp
Biohit Oyj	Lemminkäinen Oyj	Stonesoft Oyj
Biotie Therapies Oyj	Lännen Tehtaat Oyj	Stora Enso Oyj
Cargotec Oyj	Marimekko Oyj	Stromsdal Oyj
Cencorp Oyj	Martela Oyj A	Suomen Terveystalo Oyj
Componenta Oyj	Metso Oyj	Suominen Oyj
Comptel Oyj	M-real Oyj	SysOpen Digia Oyj
Cramo Oyj	Neste Oil Oyj	Talentum Oyj
Done Solutions Oyj	Nokia Oyj	Tamfelt Oyj
Efore Oyj	Nokian Renkaat Oyj	Tecnomen Oyj
Elcoteq SE	Nordic Aluminium Oyj	Tekla Oyj
Elecster Oyj	Okmetic Oyj	Teleste Oyj
Elektrobit Group Oyj	Olvi Oyj	TietoEnator Oyj
Elisa Oyj	Oral Hammaslääkärit Oyj	Tiimari Oyj Abp
Etteplan Oyj	Oriola-KD Oyj	Tulikivi Oyj A
Evia Oyj	Orion Oyj	Turkistuottajat Oyj C
Exel Oyj	Outokumpu Oyj	Turvatiimi Oyj
Finnair Oyj	Outotec Oyj	UPM-Kymmene Oyj
Finnlines Oyj	PKC GroupOyj	Uponor Oyj
Fiskars Oyj	Pohjois-Karjalan Kirjapaino Oyj	Vaahto Group Plc Oyj
Fortum Oyj	Ponsse Oyj	Vacon Oyj
F-Secure Oyj	Proha Oyj	Vaisala Oyj
Glaston Corporation	Pöyry Oyj	Viking Line Abp
HKScan Oyj	QPR Software Oyj	Wärtsilä Oyj Abp
Honkarakenne Oyj	RaisioOyj	YIT Oyj
Huhtamäki Oyj	Ramient Oyj	Yleiselektroniikka Oyj
Ilkka-Yhtymä Oyj	Rapala VMC Oyj	

Table 3. Companies excluded from the sample group

Companies were excluded from the sample group if in 2007 they were (1) classified as Financials on the OMX list, (2) acquired by another company, (3) restructured, or (4) subject to some other, highly exceptional events.

Company name	Reason for exclusion
Amanda Capital Oyj	Financials
CapMan Oyj	Financials
Citycon Oyj	Financials
Interavanti Oyj	Financials
Julius Tallberg-Kiinteistöt Oyj	Financials
Neomarkka Oyj	Financials
Nordea Bank AB	Financials
Norvestia Oyj	Financials
OMX AB	Financials
Panostaja Oyj	Financials
Pohjola Pankki Oyj	Financials
Sampo Oyj	Financials
Sponda Oyj	Financials
SSK S.Säästäjien Kiinteistöt Oyj	Financials
Technopolis Oyj	Financials
Ålandsbanken Abp	Financials
Birka Line Abp	Acquired
Kemira GrowHow Oyj	Acquired
Perlos Oyj	Acquired
Benefon Oyj	Restructured (formerly Geosentric Oyj)
Nurminen Logistics Oyj	Restructured (formerly Kasola Oyj)
Takoma Oyj	Restructured (formerly Suomen Helasto Oyj)
Trainers´ House Oyj	Restructured (formerly Satama Interactive Oyj)
SRV Group plc	Listed to stock exchange in the middle of 2007
TJ Group Oyj	Subject to court trial
(TeliaSonera AB)	Listed in Helsinki, but registered in Sweden
(Soprano Oyj)	Listed in Helsinki, but not quoted by OMX

Table 4. Sample group by industries and size

The table presents the sample group by industries and market capitalization, based on OMX classifications.

	Market Cap			
	Large	Mid	Small	Total
Consumer Discretionary	5	5	7	17
Consumer Staples	1	4	2	7
Energy	1			1
Health Care	1	2	3	6
Industrials	11	11	14	36
Information Technology	2	6	19	27
Materials	6	2	3	11
Telecommunication Services	1			1
Utilities	1			1
Total	29	30	48	107

4.3 Model specifications for empirical research

In the following we will describe how our hypotheses from the previous chapter will be empirically tested. Similar to our hypotheses development that was largely based on the previous works by Boone et al. (2007) and Coles et al. (2008), also in building empirical models we will use mostly the variables that these authors originally applied. However, there are some adjustments and additions of our own as well.

4.3.1 Scope of the operations hypothesis

Boone et al. (2007) illustrate scope of the operations with firm size as measured with log of market value, firm age in terms of years since the IPO, and the number of business segments. Coles et al. (2008) combine the number of segments, log of sales, and leverage into a factor score that is used to illustrate the firm's complexity, and thereby its need for advise. Similar to Boone et al., we will proxy for firm's operational scope with **firm size**, **firm age**, and **the number of segments**. We also add a variable describing the importance of **international operations** to the firm.

Firm size is measured with natural logarithm of the firm's market value at year-end 2006. In calculating the market value of equity for companies with dual share series, we have omitted the price differential between the two shares, and simply defined market value as the number of shares multiplied with share price, which is retrieved from the Worldscope database.

Firm age is calculated as years since the firm's entry to the Helsinki Stock exchange. In some cases, the firm's stocks have been delisted from the exchange for instance due to merger or some other form of restructuring, and the company has then been re-listed with a new share series. In these cases, we have made an attempt to trace back to the first year the company was listed.

The number of segments is as counted according to IFRS segment reporting in the firm's year-end consolidated financial statements. Many companies report "Other" segment, which in some cases holds actual business operations or otherwise accounts for a substantial amount of revenue. In some cases, however, the "Other" segment is

practically insignificant, and simply reserved for residuals that cannot be assigned to other segments. We have not included the "Other" segment into the count if its share of sales is minor.

As for importance of international operations, we rely on the geographic segmentation of revenue, also IFRS-based, in the firm's financial statements. We construct a dummy that is equal to one if at least 50% of sales are reported from countries other than Finland, or Finnish sales are reported as part of broader regional sales, and thereby not shown separately. In the latter case, we cannot identify the exact proportion of foreign sales, but we can quite confidently assume that international revenue is important to the firm due to the applied geographic segmentation.

While testing the different variables for scope of the operations as determinants of board structures, we do not construct a single factor score like Coles et al. (2008), but in the manner of Boone et al. (2007) test various board characteristics against individual characteristics that illustrate firm complexity. We will first run tests with each scope characteristic individually, and then with all scope characteristics combined into a single equation.

For control variables, as presented by Boone et al. (2007), we will rely on lagged ROA (from 2006), and a dummy set equal to one if the firm has two share classes. Additionally, we will use a dummy set equal to one in case the firm has a nomination committee, since we assume this can have effect on board structures. As for the nomination committee variable, it should be noted that we do not pay attention to how the committee is organized, but only whether it exists in the first place. In some companies the committee is solely made up of board members, in others major shareholders or the CEO may have seats as well.

4.3.2 Monitoring hypothesis

In testing monitoring hypothesis, we adopt three variables to measure monitoring costs from Boone et al. (2007): **Market-to-book ratio**, **R&D intensity**, and **risk**. Coles et al. (2008) and Linck et al. (2008) also use similar measures in their papers.

To define market-to-book ratio, we follow Boone et al. and use a calculation similar to that we will later use to proxy for Tobin's Q:

$$Market - to - book\ ratio = \frac{Book\ value\ of\ assets\ -\ Book\ value\ of\ equity\ +\ Market\ value\ of\ equity}{Book\ value\ of\ assets} \quad (1)$$

For R&D intensity, Boone et al. use a dummy equal to one if the firm's R&D spending over total assets ranks within the top quartile of the sample. We end up adopting a similar practice, since the distribution of this measure in our sample is very much skewed, so that majority of the sample firms report none or very little R&D expenditure. Consequently, we set the dummy for R&D intensity equal to one, if the firm ranks in the 75% quartile among those companies that report any R&D spending. For those companies that do not report R&D spending at all, we set the dummy equal to zero.

Finally, risk is measured as the price volatility of the firm's share value. As for definition of the volatility, we rely on the volatility measure provided by the Worldscope database.

Control variables used in testing monitoring hypothesis are the same as those described under scope of the operations hypothesis.

4.3.3 Negotiation hypothesis

To measure insider influence, we adopt the **CEO tenure** variable from Boone et al. (2007). We do not have particular variables for constraints on insider influence, but using control variables similar to previous hypotheses we set a dummy equal to one if the firm has a **nomination committee**. This variable effectively serves as a measure for constraints on insider influence. The rationale here is supported by the empirical evidence from Shivdasani and Yermack (1999). Shivdasani and Yermack define CEO being uninvolved in director selection when the firm has a nomination committee, and the CEO does not have a seat in this committee. The authors note though that in practice

an independent nomination committee might still seek for CEO opinion on director appointment.

We also considered using a dummy for the existence of a supervisory board, and a measure for ownership concentration to recognize blockholders. For supervisory boards, however, it turned out that in our sample only seven companies had a supervisory board in place. Moreover, some of these supervisory boards did not seem to be involved in nomination of board members. Also, as presented earlier, the tendency in Finland has been towards removing supervisory boards from governance systems.

Regarding concentration of ownership, we found that the median stake of the firm's largest shareholder in our sample was 16.23% by capital, and 21.73% by votes. Out of the total 107 firms in the sample, 97 had a single shareholder controlling more than 5% of votes, and 82 had a shareholder controlling more than 10% of votes. Since blockholders were encountered basically all across the sample, we decided not to include a variable on ownership concentration into the model.

Furthermore, we use the same control variables as in scope of the operations and monitoring hypotheses.

4.3.4 Board size, board composition, and firm value

We will apply the methods developed by Coles et al. (2008) and examine the relation of board size and composition to the firm's Tobin's Q, conditional to firm complexity and R&D intensity. To model firm complexity and thereby its need for advisory, Coles et al. construct a factor score based on the number of segments, log of sales, and leverage. In a similar fashion, to proxy for firm complexity we will apply the four variables that were previously defined to proxy for scope of the operations: Firm size, firm age, the number of segments, and internationality. First, for firm size, firm age, and the number of segments, we set a dummy equal to one if the firm ranks above the sample median in the given measure. To measure internationality, as done previously in scope of the operations hypothesis, we set a dummy equal to one if the firm reports at least 50% of its sales from abroad, or reports Finnish sales as part of a broader geographical segment.

Second, for each firm, we count the dummies together and divide the sum by four to obtain a score that describes complexity of the firm's operations. We will denote this score COMPLEXITY. Given that the firm may gain dummies equal to zero or one for each of the four individual complexity measures, and that the sum will be divided by four, the COMPLEXITY score can get values between zero and one.

To capture the effect of board size for complex firms, we apply the following regression equation adopted from Coles et al.:

$$Q = \beta_0 + \beta_1 \, x \, ln(Board\ size) + \beta_2 \, x \, ln(Board\ size) \, x \, COMPLEXITY + Fraction\ non-independent + COMPLEXITY + Controls \quad (2)$$

As Coles et al. put forward, β_1 describes the effect of board size on Tobin's Q for simple firms, while β_2 picks the additional effect of board size according to the degree of the firm's complexity.

Coles et al. use a corresponding method to examine the relation of insider fraction to Tobin's Q with consideration to the firm's R&D intensity. We will construct a similar equation, with the exception of using the fraction of non-independent board members instead of insider directors, since we do not have appropriate data to distinguish between independent outsiders and non-independent outsiders. In measuring the effect of non-independent directors on the firm's Tobin's Q conditional to the firm's R&D intensity, we will use the following equation:

$$Q = \beta_0 + \beta_1 \, x \, Fraction\ non-independent + \beta_2 \, x \, Fraction\ non-independent \, x \, R\&D\ intensity + ln(Board\ size) + R\&D\ intensity + Controls \quad (3)$$

As with the previous equation on board size, β_1 describes the effect of the non-independent directors' fraction on Tobin's Q for firms that are not defined as R&D intensive, while β_2 captures the additional impact of non-independent directors' fraction for R&D intensive firms.

R&D intensity is defined similarly as above in the monitoring hypothesis, that is, we set the dummy for R&D intensity equal to one if the firm ranks in the 75% quartile among those companies that report any R&D spending. For those companies that do not report R&D spending at all, we set the dummy equal to zero.

To measure Tobin's Q, we will use an approximation similar to that by Coles et al.:

$$Q = \frac{\textit{Book value of assets - Book value of equity + Market value of equity}}{\textit{Book value of assets}} \quad (4)$$

In calculating the market value of equity for companies with dual share series, we have omitted the price differential between the two shares, and simply defined market value as the number of shares times share price, which is retrieved from the Worldscope database. However, the error in the value of Tobin's Q that results from this simplification is likely to be minor.

For control variables, we rely on Coles et al. and use share price volatility, return on assets from 2006 and 2007, as well as the proportion of intangible assets.

4.4 Sources and collection of data

Data on boards is based on those directors that were elected in firms' year 2007 Annual General Meetings (AGMs). For most corporations the financial year is the calendar year and thereby the AGM was held in early 2007, although a few exceptions apply and the board was elected in late 2007. However, these exceptions represent a small minority in the sample. The data on boards was hand-collected from the companies' websites and annual reports between December 2007 and May 2008, and some information on director nationalities was complemented with inquiries to the companies. Collection of data on board characteristics was split with one fellow student, and the collected data was finally shared among the two of us.

With the exception of some performance measures the data on firm characteristics are mostly based on year-end 2006 information, since these characteristics are assumed to have influenced board election in the AGM of 2007. Potential changes in firm

characteristics between the year-end 2006 and the AGM 2007 are ignored. However, errors from this are assumed to be minor, for fundamental firm features should be stable over short periods of time. The data on firm performance is partly based on year-end 2007 information. We use performance data from 2007, since we assume this information is the most relevant available benchmark for measuring success of the board that was elected in the AGM 2007. The data on firm characteristics was hand-collected from annual reports and corporate websites, as well as retrieved from the Worldscope database. Additionally, to define firm age as years since the IPO, dates for stock exchange listings are retrieved from the website of Pörssitieto, which is annual publication that provides information on Finnish public listed companies.

Table 5. Summary statistics

The table reports summary statistics for the sample. *Board size* is the number of directors in the board. *Fraction of independent directors* is the percentage of independent directors in the board, as stated by the company. *Nomination committee* is a value equal to one if the firm reports having a nomination committee. *CEO tenure* is the number of years the present chief executive officer has served in the position. *Firm age* is the number of years since the firm's IPO. *Number of segments* is as reported by the firm according to IFRS. *Internationality* is a value equal to one if the firm reports at least 50% of its sales from overseas, or reports Finnish sales as part of a broader geographic segment. *R&D expenditure* is the firm's R&D spending over total assets. *Intangibles* is the proportion of intangible assets out of the total firm assets. *Risk* is volatility of the firm's share price. ROA_{2006} is the firm's return on assets in 2006. ROA_{2007} is the firm's return on assets in 2007. *Market-to-book* is market value of equity plus book value of debt, divided by total assets. *Tobin's* Q_{2007} is market value of equity plus book value of debt, divided by total assets. *Dual share class* is a value equal to one if the firm has two share series. *COMPLEXITY* is a score with values in between zero and one, increasing in quartiles if the firm is above the sample's median in ln(Market value), Firm age, or Number of segments, or the Internationality dummy is set equal to one.

	n	Mean	Min	25th percentile	Median	75th percentile	Max
Board and CEO charatectristics							
Board size	107	6.1	3	5	6	7	11
Fraction of independent directors	104	0.69	0.17	0.57	0.67	0.84	1.00
Number of female directors	107	0.8	0	0	1	1	3
Number of foreign directors	105	0.8	0	0	0	1	6
Nomination committee	107	0.4	0	0	0	1	1
CEO tenure	105	4.1	0	1	2	5	24
Firm characteristics							
Market value (millions of euros)	106	1725.1	4	58	196	1083	61390
Firm age	107	20.0	0	8	13	21	92
Number of segments	107	2.5	1	1	2	3	8
Internationality	107	0.7	0	0	1	1	1
R&D expenditure	76	0.05	0.00	0.01	0.02	0.07	0.33
Intangibles	107	0.17	0.00	0.03	0.10	0.26	0.77
Risk	97	28.0	9.6	20.8	26.1	33.3	53.9
ROA_{2006}	107	7.5	-38.7	3.9	7.8	13.1	33.4
ROA_{2007}	83	7.9	-47.6	4.0	8.7	12.9	36.1
Market-to-book	106	1.9	0.8	1.3	1.7	2.4	5.0
Tobin's Q_{2007}	96	1.9	0.8	1.1	1.5	2.2	6.4
Dual share class	107	0.3	0	0	0	1	1
COMPLEXITY	107	0.52	0	0.25	0.50	0.75	1.0

5. Empirical research

5.1 Multivariate results

5.1.1 Scope of the operations hypothesis

Table 6 presents regression results on testing scope of the operations hypothesis. To examine determinants of board structures, board size, the fraction of independent directors, presence of female directors, and presence of foreign directors are used as dependent variables in Panels A, B, C, and D, respectively.

Table 6. Scope of the operations hypothesis

Panels A, B, C, and D report regression coefficients with the referred dependent variable. *Board size* is the number of directors in the board. *Fraction independent* is the percentage of independent directors in the board, as stated by the company. *Female presence* is a dummy set equal to one if there is a female director in the board. *Foreigner presence* is a dummy set equal to one if there is a foreign director in the board. *Firm size* is the natural logarithm of the market value of the firm's equity at the end of 2006. *Firm age* is the number of years since the firm's IPO. *Number of segments* is as reported by the firm according to IFRS. *Internationality* is a dummy set equal to one if the firm reports at least 50% of its sales from overseas, or reports Finnish sales as part of a broader geographic segment. *Dual share class* is a dummy equal to one if the firm has two share series. ROA_{2006} is the firm's return on assets in 2006. *Intangibles* is the proportion of intangible assets out of the total firm assets. *Nomination committee* is a dummy set equal to one if the firm reports having a nomination committee. *p-values* for regression coefficients are given in parentheses. *, **, and *** indicate statistical significance at <0.05, <0.01, and <0.001 levels, respectively.

Panel A. Board size as the dependent variable

	Model 1	Model 2	Model 3	Model 4	Model 5
Variables used to measure the scope of operations					
Firm size	0.510***				0.395***
	(0.000)				(0.000)
Firm age		0.029***			0.009
		(0.000)			(0.239)
Number of segments			0.395***		0.120
			(0.000)		(0.213)
Internationality				0.489	0.268
				(0.146)	(0.336)
Control variables					
Dual share class	0.288	-0.282	0.120	0.106	0.105
	(0.290)	(0.385)	(0.694)	(0.749)	(0.721)
ROA_{2006}	-0.010	0.0204	0.014	0.024	-0.007
	(0.362)	(0.086)	(0.243)	(0.059)	(0.561)
Intangibles	1.156	0.798	0.112	1.068	1.072
	(0.085)	(0.289)	(0.882)	(0.207)	(0.132)
Nomination committee	0.647*	1.101***	1.088***	1.221***	0.651*
	(0.015)	(0.000)	(0.000)	(0.000)	(0.014)
Intercept	-4.266**	4.830***	4.531***	4.830***	-2.666
	(0.002)	(0.000)	(0.000)	(0.000)	(0.099)
Industry dummies	yes	yes	yes	yes	yes
Adjusted R^2	0.469	0.306	0.313	0.195	0.477
F-statistic	8.13	4.60	4.72	2.98	6.97
Number of observations	106	107	107	107	106
p-value	<.0001	<.0001	<.0001	0.001	<.0001

To proxy for scope of the operations, firm size, firm age, the number of segments, and a dummy for internationality of operations are used in all panels as independent variables to explain the given dependent variable for board structure.

Firm size is measured using natural logarithm of the market value of the firm's equity at year-end 2006. Firm age is the number of years since the firm's IPO. Number of segments is based on the firm's IFRS segment reporting from year-end consolidated financial statements. Finally, Internationality is a dummy set equal to one if the firm reports at least 50% of its sales from abroad, or reports Finnish sales as part of a broader geographic segment in IFRS-based segment reporting in year-end consolidated financial statements.

Models 1, 2, 3, and 4 test the independent variables with the dependent variable individually. Finally, model 5 includes all independent variables into a single regression equation to explain the referred dependent variable. In all models, we will employ a similar set of control variables: A dummy set equal to one if the firm has two share series, previous year's return on assets, the proportion of intangible assets out of the total firm assets, and a dummy set equal to one if the firm has a nomination committee in place. In addition, intercept and industry dummies are used in all regressions.

Panel A reports the results for board size as the dependent variable. Used individually in models 1 to 3, firm size, firm age, and the number of segments relate positively to board size, all statistically at very significant levels. The dummy variable for internationality in model 4, however, does not perform to explain board size. Combined into a single equation in model 5, only the coefficient for firm size remains statistically significant, while the p-values for all the other scope of the operations variables fail to keep at statistically significant levels. As for control variables, previous year's ROA approaches statistical significance in models 2 and 4, and the proportion of intangible assets does the same in model 1. However, the dummy variable for existence of a nomination committee is the sole control variable that explains board size at significant levels in all models except for model 5.

Panel B. Fraction independent as the dependent variable					
	Model 1	Model 2	Model 3	Model 4	Model 5
Variables used to measure the scope of operations					
Firm size	0.032*				0.024
	(0.015)				(0.146)
Firm age		0.002			0.001
		(0.093)			(0.600)
Number of segments			0.023		0.005
			(0.119)		(0.752)
Internationality				0.036	0.013
				(0.475)	(0.797)
Control variables					
Dual share class	-0.136**	-0.165**	-0.139**	-0.140**	-0.150**
	(0.006)	(0.002)	(0.006)	(0.006)	(0.007)
ROA_{2006}	-0.000	0.002	0.001	0.002	0.000
	(0.996)	(0.335)	(0.443)	(0.278)	(0.908)
Intangibles	0.083	0.047	0.006	0.069	0.079
	(0.482)	(0.693)	(0.960)	(0.585)	(0.538)
Nomination committee	0.014	0.050	0.050	0.057	0.015
	(0.762)	(0.265)	(0.262)	(0.204)	(0.746)
Intercept	0.106	0.666***	0.651***	0.661***	0.208
	(0.663)	(0.000)	(0.000)	(0.000)	(0.475)
Industry dummies	yes	yes	yes	yes	yes
Adjusted R^2	0.150	0.111	0.107	0.088	0.126
F-statistic	2.39	1.99	1.95	1.76	1.92
Number of observations	103	104	104	104	103
p-value	0.008	0.031	0.035	0.062	0.029

Panel B reports the results for the fraction of independent directors as the dependent variable. Only firm size individually in model 1 is able to account positively and significantly for board independence. For control variables, dual share class relates negatively and significantly to the fraction of independent directors in all models. Other control variables, including the dummy for nomination committee, do not seem to explain board independence. Overall, the adjusted R-squared remains low in all models and the strongest explanatory power falls for firm size, as well as the existence of dual share series.

Panel C reports the results for female director presence in the board. The results resemble those for board size presented in Panel A. In models 1 and 2, firm size and firm age explain female presence positively and significantly. The positive regression coefficient for the number of segments leaves slightly shy of statistical significance.

Panel C. Female presence as the dependent variable					
	Model 1	Model 2	Model 3	Model 4	Model 5
Variables used to measure the scope of operations					
Firm size	0.0719*				0.046
	(0.017)				(0.224)
Firm age		0.006*			0.004
		(0.018)			(0.244)
Number of segments			0.064		0.020
			(0.062)		(0.620)
Internationality				-0.082	-0.097
				(0.482)	(0.400)
Control variables					
Dual share class	0.165	0.044	0.130	0.142	0.112
	(0.144)	(0.708)	(0.250)	(0.220)	(0.361)
ROA_{2006}	0.004	0.008	0.007	0.008	0.004
	(0.458)	(0.072)	(0.120)	(0.056)	(0.376)
Intangibles	-0.022	-0.045	-0.160	-0.119	-0.133
	(0.936)	(0.870)	(0.569)	(0.684)	(0.651)
Nomination committee	0.166	0.206*	0.212*	0.255*	0.178
	(0.128)	(0.046)	(0.042)	(0.017)	(0.104)
Intercept	-0.946	0.311**	0.282*	0.460**	-0.475
	(0.097)	(0.009)	(0.030)	(0.002)	(0.476)
Industry dummies	yes	yes	yes	yes	yes
Adjusted R^2	0.162	0.157	0.138	0.109	0.161
F-statistic	2.56	2.52	2.30	2.00	2.26
Number of observations	106	107	107	107	106
p-value	0.005	0.005	0.011	0.029	0.008

Similar to Panel A, when combined into a single equation, the explanatory power of independent variables' individual coefficients vanishes away. As for control variables, only the existence of a nomination committee is able to account positively for female presence at significant levels, while also previous year's ROA gives some signs for positive interrelation in models 2 and 4.

Finally, Panel D presents the results for foreign director presence. Similar to other dependent variables for board structure, firm size accounts positively also for foreigners' directorships. However, this time also the internationality measure relates positively and significantly with the dependent variable in both models 4 and 5. For control variables, dual share class system relates negatively and significantly to foreigner presence in all models. In contrast, the existence of a nomination committee seems to have a positive influence.

Panel D. Foreigner presence as the dependent variable					
	Model 1	Model 2	Model 3	Model 4	Model 5
Variables used to measure the scope of operations					
Firm size	0.089**				0.101**
	(0.002)				(0.004)
Firm age		0.003			0.000
		(0.306)			(0.900)
Number of segments			0.013		-0.046
			(0.686)		(0.198)
Internationality				0.333**	0.277**
				(0.002)	(0.009)
Control variables					
Dual share class	-0.239*	-0.289*	-0.252*	-0.284**	-0.252*
	(0.023)	(0.012)	(0.022)	(0.007)	(0.023)
ROA_{2006}	-0.005	0.001	0.001	0.001	-0.004
	(0.277)	(0.845)	(0.854)	(0.744)	(0.327)
Intangibles	-0.254	-0.349	-0.378	-0.112	0.022
	(0.317)	(0.186)	(0.163)	(0.668)	(0.933)
Nomination committee	0.138	0.247*	0.256*	0.222*	0.119
	(0.176)	(0.015)	(0.012)	(0.021)	(0.227)
Intercept	-1.309*	0.313**	0.323*	0.085	-1.654**
	(0.013)	(0.007)	(0.010)	(0.523)	(0.006)
Industry dummies	yes	yes	yes	yes	yes
Adjusted R^2	0.196	0.113	0.104	0.193	0.250
F-statistic	2.94	2.02	1.93	2.92	3.15
Number of observations	104	105	105	105	104
p-value	0.001	0.028	0.037	0.001	0.000

5.1.2 Monitoring hypothesis

Table 7 presents regression results on testing board size and the fraction of independent directors with variables describing the firm's monitoring costs. Board size and the fraction of independent directors are used as dependent variables in Panels A and B, respectively. To proxy for monitoring costs, market-to-book ratio, R&D intensity, and risk are used as independent variables in both panels to explain board size and board composition. Market-to-book ratio is defined as the firm's book value of assets less book value of equity plus market value of equity, all divided by book value of assets. R&D intensity is a dummy set equal to one if the firm's R&D spending over the firm's total assets ranks within the top quartile in the sample. Risk is the share price volatility measure retrieved from the Worldscope database.

Table 7. Monitoring hypothesis

Panels A and B report regression coefficients with the referred dependent variables. *Board size* is the number of directors in the board. *Fraction independent* is the percentage of independent directors in the board, as stated by the company. *ln(Market-to-book)* is natural logarithm of market value of equity plus book value of debt, divided by total assets. *R&D intensity* is a dummy set equal to one, in case the firm's R&D spending over total assets ranks within the 75th percentile of the sample. *Risk* is volatility of the firm's share price. *Firm size* is the natural logarithm of the market value of the firm's equity at the end of 2006. *Firm age* is the number of years since the firm's IPO. *Number of segments* is as reported by the firm according to IFRS. *Internationality* is a dummy set equal to one if the firm reports at least 50% of its sales from overseas, or reports Finnish sales as part of a broader geographic segment. *Dual share class* is a dummy equal to one if the firm has two share series. ROA_{2006} is the firm's return on assets in 2006. *Intangibles* is the proportion of intangible assets out of the total firm assets. *Nomination committee* is a dummy set equal to one if the firm reports having a nomination committee. *p-values* for regression coefficients are given in parentheses. *, **, and *** indicate statistical significance at <0.05, <0.01, and <0.001 levels, respectively.

Panel A. Board size as the dependent variable

	Model 1	Model 2	Model 3	Model 4	Model 5
Variables used to measure monitoring costs					
ln(Market-to-book)	0.121			-0.206	-0.849*
	(0.746)			(0.638)	(0.021)
R&D intensity		0.752		1.191*	1.027*
		(0.072)		(0.020)	(0.011)
Risk			-0.031	-0.039*	-0.016
			(0.108)	(0.044)	(0.290)
Variables used to measure the scope of operations					
Firm size					0.500***
					(0.000)
Firm age					0.003
					(0.694)
Number of segments					0.091
					(0.368)
Internationality					0.231
					(0.404)
Control variables					
Dual share class	0.193	0.180	0.061	0.047	0.137
	(0.576)	(0.584)	(0.870)	(0.900)	(0.674)
ROA_{2006}	0.022	0.024	0.019	0.023	0.001
	(0.116)	(0.057)	(0.178)	(0.133)	(0.936)
Intangibles	0.699	1.067	0.77801	1.164	1.482
	(0.398)	(0.198)	(0.387)	(0.194)	(0.051)
Nomination committee	1.314***	1.347***	1.309***	1.424***	0.697*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.012)
Intercept	5.146***	5.046***	6.164***	6.221***	-3.705
	(0.000)	(0.000)	(0.000)	(0.000)	(0.063)
Industry dummies	yes	yes	yes	yes	yes
Adjusted R^2	0.181	0.205	0.187	0.224	0.536
F-statistic	2.78	3.10	2.84	2.98	7.17
Number of observations	106	107	97	97	97
p-value	0.002	0.001	0.003	0.001	<.0001

Models 1, 2 and 3 test the independent variables for monitoring costs individually with the referred dependent variable. Model 4 includes all independent variables into a single regression equation to explain board size and composition. Finally, in model 5 we add to model 4 all the independent variables from the scope of operations hypothesis to explain board size and composition. Control variables used throughout testing monitoring hypothesis are the same as above in scope of the operations hypothesis.

Panel A reports results for board size as the dependent variable. In models 1 to 3, none of the variables describing monitoring costs reach statistical significance individually, although the positive coefficient for R&D intensity and the negative coefficient for risk show p-values that could indicate some relation with board size. Furthermore, when all the independent variables are included into a single equation in model 4, these coefficients for R&D intensity and risk gain statistical significance. With the exception of positive and strongly significant dummy for the existence of a nomination committee, other control variables do not present significant explanatory power in models 1 to 4.

Finally, when in model 5 the independent variables from scope of the operations hypothesis are added on to explain board size, the coefficient for market-to-book ratio turns negative at significant level. R&D intensity remains positive and significant, while the measure for risk is no longer significant as in model 4. From scope of the operations hypothesis, only firm size explains board size positively and significantly. For control variables, only the existence of a nomination committee contributes positively and significantly, although the positive coefficient for the proportion of intangible assets just misses the 0.05 significance level. Overall, the R-squared measure indicates that model 5 is able to account for some 53% of variations in board size.

Panel B reports the results for the fraction of independent directors as the dependent variable. In models 1 to 4, none of the variables describing monitoring costs either individually or combined together get even close to statistically meaningful significance levels to explain board independence. Combining monitoring costs variables together with the scope of operations variables in model 5 does not bring improved results. As previously in testing scope of the operations hypothesis, only the control variable for dual share class performs at significant levels in all models.

Panel B. Fraction independent as the dependent variable					
	Model 1	Model 2	Model 3	Model 4	Model 5
Variables used to measure monitoring costs					
ln(Market-to-book)	0.034			0.053	0.024
	(0.539)			(0.421)	(0.732)
R&D intensity		0.014		-0.020	-0.032
		(0.823)		(0.788)	(0.673)
Risk			-0.001	-0.001	0.000
			(0.764)	(0.764)	(0.965)
Variables used to measure the scope of operations					
Firm size					0.018
					(0.401)
Firm age					0.002
					(0.211)
Number of segments					-0.001
					(0.959)
Internationality					0.017
					(0.762)
Control variables					
Dual share class	-0.135**	-0.136**	-0.145**	-0.135*	-0.162*
	(0.009)	(0.007)	(0.010)	(0.020)	(0.012)
ROA_{2006}	0.002	0.002	0.001	0.000	-0.000
	(0.411)	(0.278)	(0.580)	(0.852)	(0.857)
Intangibles	0.061	0.048	0.102	0.108	0.131
	(0.618)	(0.696)	(0.436)	(0.422)	(0.367)
Nomination committee	0.058	0.062	0.041	0.043	0.003
	(0.203)	(0.167)	(0.398)	(0.387)	(0.951)
Intercept	0.671***	0.687***	0.713***	0.686***	0.312
	(0.000)	(0.000)	(0.000)	(0.000)	(0.413)
Industry dummies	yes	yes	yes	yes	yes
Adjusted R^2	0.096	0.083	0.070	0.054	0.079
F-statistic	1.83	1.72	1.58	1.38	1.45
Number of observations	103	104	94	94	94
p-value	0.050	0.071	0.113	0.182	0.136

5.1.3 Negotiation hypothesis

Table 8 presents regression results for testing the effect of insider influence, as measured with CEO tenure, to the fraction of independent directors in the board. CEO tenure is defined as the current chief executive officer's years in this duty. Control variables are the same as used above in scope of the operations hypothesis and monitoring hypothesis.

Model 1 tests the effect of CEO tenure to the fraction of independent directors. The coefficient for CEO tenure is negative, however, not at statistically significant levels. For control variables, as previously the dummy for dual share class shows negative and significant coefficient. Model 2 that includes the independent variables from monitoring

hypothesis does not essentially change these results. Model 3 that further adds in scope of the operations variables does not bring about better performance either.

Table 8. Negotiation hypothesis

The table reports regression coefficients with the referred dependent variable. *Fraction independent* is the percentage of independent directors in the board, as stated by the company. *CEO tenure* is the number of years the present chief executive officer has served in the position. *ln(Market-to-book)* is natural logarithm of market value of equity plus book value of debt, divided by total assets. *R&D intensity* is a dummy set equal to one, in case the firm's R&D spending over total assets ranks within the 75th percentile of the sample. *Risk* is volatility of the firm's share price. *Firm size* is the natural logarithm of the market value of the firm's equity at the end of 2006. *Firm age* is the number of years since the firm's IPO. *Number of segments* is as reported by the firm according to IFRS. *Internationality* is a dummy set equal to one if the firm reports at least 50% of its sales from overseas, or reports Finnish sales as part of a broader geographic segment. *Dual share class* is a dummy equal to one if the firm has two share series. ROA_{2006} is the firm's return on assets in 2006. *Intangibles* is the proportion of intangible assets out of the total firm assets. *Nomination committee* is a dummy set equal to one if the firm reports having a nomination committee. *p-values* for regression coefficients are given in parentheses. *, **, and *** indicate statistical significance at <0.05, <0.01, and <0.001 levels, respectively.

Fraction independent as the dependent variable

	Model 1	Model 2	Model 3
Variables used to measure insider influence			
CEO tenure	-0.007	-0.006	-0.004
	(0.121)	(0.240)	(0.397)
Variables used to measure monitoring costs			
ln(Market-to-book)		0.040	0.020
		(0.557)	(0.784)
R&D intensity		-0.018	-0.026
		(0.820)	(0.739)
Risk		-0.001	0.000
		(0.793)	(0.973)
Variables used to measure the scope of operations			
Firm size			0.015
			(0.491)
Firm age			0.002
			(0.239)
Number of segments			0.002
			(0.925)
Internationality			0.026
			(0.649)
Control variables			
Dual share class	-0.134**	-0.131*	-0.158*
	(0.008)	(0.025)	(0.016)
ROA_{2006}	0.002	0.001	-0.000
	(0.229)	(0.718)	(0.963)
Intangibles	0.011	0.092	0.132
	(0.934)	(0.534)	(0.414)
Nomination committee	0.056	0.039	0.004
	(0.213)	(0.442)	(0.947)
Intercept	0.732***	0.723***	0.375
	(0.000)	(0.000)	(0.352)
Industry dummies	yes	yes	yes
Adjusted R^2	0.109	0.061	0.080
F-statistic	1.95	1.40	1.42
Number of observations	102	92	92
p-value	0.035	0.171	0.146

5.1.4 Board size, board composition, and firm value

Table 9 presents the results for testing the relation of board size and the fraction of independent directors to Tobin's Q. Tests are made both with and without proxies for firm-specific operational complexity and R&D intensity. Tobin's Q is the firm's book value of assets less book value of equity plus market value of equity, all divided by book value of assets. COMPLEXITY is a score that attempts to measure the complexity of the firm's operations. The score gets values from between zero and one, and increases in quartiles based on whether the firm ranks below or above the sample median in firm size, firm age, or the number of segments, or the dummy for internationality is set equal to one as described earlier. In this stage, the sample on performance measures has been adjusted so that values on ROA_{2006}, ROA_{2007}, and Tobin's Q_{2007} that are more than three standard deviations away from the sample mean have been cleared from the data.

As for board size, model 1 tests the relation of board size to Tobin's Q without consideration to firm complexity. The regression coefficient for board size is negative and statistically significant. As for other variables, the dummy for R&D intensity and ROA_{2007} gain positive and significant coefficients. Model 2 adds the variable ln(Board size) x COMPLEXITY that picks the effect of board size with consideration to firm complexity, as measured with the COMPLEXITY variable. In this model, the regression coefficient for board size for all firms, without the COMPLEXITY factor, remains negative at significant levels. The coefficient for board size with the additional effect firm complexity is positive, however, not at significant levels. The effects of R&D intensity and ROA_{2007} remain similar as in model 1.

For board independence, model 3 tests how the fraction of non-independent directors affects Tobin's Q. There is no evident relation between the two variables. From control variables, R&D intensity and ROA_{2007} have positive and significant effects on Tobin's Q, as previously in models 1 and 2 on board size. Model 4 introduces the variable that captures the additional effect of non-independent director representation for R&D intensive firms. Results do not change from model 3, except for the fact that the coefficient for R&D intensity dummy in control variables falls slightly out of statistical

significance. Finally model 5 combines model 2 and model 4, so that board size and the fraction of non-independent directors, as well as the additional variables for complex and R&D intensive firms are all included into a single equation to explain Tobin's Q. Out of the actual independent variables, only the negative coefficient for ln(Board size) that measures the effect of board size on Tobin's Q for all firms remains significant. As in model 2, the coefficient for ln(Board size) x COMPLEXITY that measures the effect of board size on Tobin's Q with the complexity of the firm is positive but fails to reach statistical significance.

Table 9. Board size, board composition, and firm value

Tobin's Q_{2007} is market value of equity plus book value of debt, divided by total assets. *ln(Board size)* is natural logarithm of the number of directors in the board. *COMPLEXITY* is a score with values in between zero and one, increasing in quartiles if the firm is above the sample's median in ln(Market value), Firm age, Number of segments, or the Internationality dummy is set equal to one. *Fraction non-independent* is the percentage of non-independent directors in the board, as stated by the company. *R&D intensity* is a dummy set equal to one, in case the firm's R&D spending over total assets ranks within the 75th percentile of the sample. *Risk* is volatility of the firm's share price. ROA_{2006} is the firm's return on assets in 2006. ROA_{2007} is the firm's return on assets in 2007. *Intangibles* is the proportion of intangible assets out of the total firm assets. *p-values* for regression coefficients are given in parentheses. *, **, and *** indicate statistical significance at <0.05, <0.01, and <0.001 levels, respectively. Performance measures have been adjusted so that for Tobin's Q_{2007}, ROA_{2006}, and ROA_{2007} values more than three standard deviations away from the mean have been cleared from the sample.

Tobin's $_{2007}$ Q as the dependent variable					
	Model 1	Model 2	Model 3	Model 4	Model 5
ln(Board size)	-0.692*	-1.430*			-1.452*
	(0.041)	(0.023)			(0.022)
ln(Board size) x COMPLEXITY		1.338			1.265
		(0.160)			(0.185)
Fraction non-independent	-0.263	-0.316	-0.178	-0.077	-0.161
	(0.484)	(0.399)	(0.644)	(0.856)	(0.694)
Fraction non-independent x R&D intensity				-0.649	-1.027
				(0.566)	(0.355)
COMPLEXITY	0.230	-2.231	-0.065	-0.066	-2.073
	(0.418)	(0.207)	(0.798)	(0.795)	(0.244)
R&D intensity	0.779**	0.854***	0.677**	0.924	1.251*
	(0.002)	(0.001)	(0.007)	(0.066)	(0.014)
Risk	-0.003	-0.005	0.005	0.003	-0.007
	(0.794)	(0.629)	(0.627)	(0.732)	(0.478)
ROA_{2007}	0.049***	0.046***	0.050***	0.048***	0.042***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
ROA_{2006}	-0.005	-0.004	-0.003	-0.001	-0.002
	(0.635)	(0.665)	(0.772)	(0.893)	(0.842)
Intangibles	-0.216	-0.215	-0.213	-0.161	-0.133
	(0.661)	(0.659)	(0.675)	(0.757)	(0.789)
Intercept	2.413**	3.852**	1.134**	1.145**	3.907**
	(0.002)	(0.003)	(0.005)	(0.005)	(0.003)
Industry dummies	yes	yes	yes	yes	yes
Adjusted R^2	0.416	0.427	0.379	0.371	0.426
F-statistic	4.41	4.33	4.15	3.83	4.10
Number of observations	68	68	68	68	68
p-value	<.0001	<.0001	<.0001	0.000	<.0001

5.2 Discussion of results

5.2.1 Summary of results and validity concerns

Table 10. Hypotheses for empirical research and observed relations
The table describes the expected relations of board structures to firm characteristics and firm value, and the observed empirical relation. The hypothesized relation is presented with the sign on the left, while the sign for the observed relation is presented on the right. ? signals that no statistically significant relationship was found. *Board size* is the number of directors in the board. *Fraction independent* is the percentage of independent directors in the board, as stated by the company. *Female presence* is a dummy set equal to one if there is a female director in the board. *Foreigner presence* is a dummy set equal to one if there is a foreign director in the board. *Firm size* is the natural logarithm of the market value of the firm's equity at the end of 2006. *Firm age* is the number of years since the firm's IPO. *Number of segments* is as reported by the firm according to IFRS. *Internationality* is a dummy set equal to one if the firm reports at least 50% of its sales from overseas, or reports Finnish sales as part of a broader geographic segment. *Market-to-book* is market value of equity plus book value of debt, divided by total assets. *R&D intensity* is a dummy set equal to one, in case the firm's R&D spending over total assets ranks within the 75th percentile of the sample. *Risk* is volatility of the firm's share price. *CEO tenure* is the number of years the present chief executive officer has served in the position. *Nomination committee* is a dummy equal to one if the firm reports having a nomination committee. *COMPLEXITY* is a score with values in between zero and one, increasing in quartiles if the firm is above the sample's median in ln(Market value), Firm age, Number of segments, or the Internationality dummy is set equal to one.

	Board size	**Fraction independent**	**Female presence**	**Foreigner presence**
Scope of the operations hypothesis				
Measures for scope of the operations				
Firm size	+/+	+/+	+/+	+/+
Firm age	+/+	+/?	+/+	+/?
Number of segments	+/+	+/?	+/?	+/?
Internationality	+/?	+/?	+/?	+/+
Monitoring hypothesis				
Measures for monitoring costs				
Market-to-book	-/?	-/?		
R&D intensity	-/+	-/?		
Risk	-/-	-/?		
Negotiation hypothesis				
Measures for insider influence				
CEO tenure		-/?		
Measures for constraints on insider influence				
Nomination committee		+/?		
Effect on value in firms with higher				
COMPLEXITY	+/?			
R&D intensity		+/?		

The hypotheses and results of the empirical research are summarized in Table 10. Overall, our empirical tests provide support for scope of the operations hypothesis, mixed evidence for monitoring hypothesis, and weak signs in favour of negotiation hypothesis. In interpreting the results, however, it has to be noted though our work is subject to several validity constraints that relate to individual variables, sample size, and the methodology we use. Internal validity issues regarding individual variables, such as lacking explanatory power or excessive correlation with other variables, will be considered when the results of the empirical study are discussed in the following.

Table 11. Correlation coefficients of regression variables

The table reports regression coefficients with the referred dependent variable. p-values are reported below correlation coefficients. Performance measures have been adjusted so that for Tobin's Q_{2007}, ROA_{2006}, and ROA_{2007} values more than three standard deviations away from the mean have been cleared from the sample.

	Board size	Fraction independent	Female presence	Foreigner presence	Nomination committee	CEO tenure	Firm size	Firm Age	Number of segments	Internatio-nality	R&D intensity	Intangibles	Risk	ROA_{2006}	ROA_{2007}	ln(Market-to-book)	Tobin's Q_{2007}	Dual share class
Fraction independent	0.24																	
	0.01																	
Female presence	0.36	0.06																
	0.00	0.54																
Foreigner presence	0.36	0.13	0.12															
	0.00	0.21	0.23															
Nomination committee	0.43	0.18	0.23	0.32														
	<.0001	0.06	0.02	0.00														
CEO tenure	-0.21	-0.22	0.10	-0.09	-0.14													
	0.04	0.03	0.33	0.34	0.15													
Firm size	0.65	0.33	0.38	0.39	0.37	-0.18												
	<.0001	0.00	<.0001	<.0001	0.00	0.06												
Firm Age	0.45	0.06	0.34	0.09	0.17	-0.03	0.48											
	<.0001	0.56	0.00	0.34	0.08	0.79	<.0001											
Number of segments	0.49	0.22	0.27	0.12	0.22	-0.05	0.58	0.41										
	<.0001	0.02	0.01	0.21	0.02	0.63	<.0001	<.0001										
Internationality	0.11	0.00	-0.05	0.33	0.13	-0.05	0.12	0.07	-0.03									
	0.26	0.96	0.64	0.00	0.19	0.58	0.24	0.50	0.77									
R&D intensity	-0.05	-0.05	-0.14	-0.11	-0.17	-0.13	-0.08	-0.09	-0.20	0.18								
	0.58	0.63	0.14	0.25	0.07	0.20	0.41	0.35	0.04	0.07								
Intangibles	0.06	0.10	-0.09	-0.09	0.07	-0.18	-0.11	-0.14	0.11	-0.28	-0.14							
	0.56	0.30	0.36	0.35	0.47	0.07	0.25	0.14	0.28	0.00	0.14							
Risk	-0.31	0.02	-0.36	-0.07	-0.04	-0.14	-0.33	-0.28	-0.20	0.14	0.39	0.13						
	0.00	0.82	0.00	0.47	0.69	0.18	0.00	0.00	0.05	0.19	<.0001	0.20						
ROA_{2006}	0.10	0.00	0.13	0.04	-0.15	0.14	0.34	0.08	0.13	0.04	0.09	-0.10	-0.19					
	0.33	1.00	0.19	0.67	0.12	0.14	0.00	0.43	0.19	0.69	0.38	0.33	0.06					
ROA_{2007}	0.00	0.16	0.11	-0.11	-0.12	0.02	0.19	0.03	-0.02	-0.18	-0.06	-0.02	-0.25	0.62				
	0.97	0.17	0.32	0.33	0.29	0.85	0.09	0.82	0.85	0.11	0.57	0.83	0.03	<.0001				
ln(Market-to-book)	0.00	0.07	0.05	0.02	-0.09	-0.10	0.23	-0.01	-0.07	0.02	0.46	-0.06	0.08	0.47	0.49			
	0.98	0.47	0.60	0.83	0.36	0.33	0.02	0.88	0.47	0.85	<.0001	0.54	0.45	<.0001	<.0001			
Tobin's Q_{2007}	-0.10	0.03	0.14	0.06	-0.10	0.01	0.20	0.01	-0.17	0.06	0.40	-0.08	0.05	0.40	0.46	0.90		
	0.35	0.81	0.17	0.59	0.36	0.91	0.05	0.89	0.11	0.60	<.0001	0.42	0.66	<.0001	<.0001	<.0001		
Dual share class	0.03	-0.24	0.20	-0.22	-0.05	0.07	0.01	0.33	0.00	0.06	-0.08	-0.29	-0.33	0.04	-0.04	-0.11	-0.05	
	0.76	0.01	0.04	0.02	0.61	0.50	0.92	0.00	0.96	0.52	0.41	0.00	0.00	0.67	0.70	0.28	0.62	
COMPLEXITY	0.50	0.21	0.37	0.24	0.26	-0.07	0.71	0.54	0.62	0.46	-0.09	-0.17	-0.29	0.20	0.03	0.02	0.00	0.17
	<.0001	0.03	<.0001	0.01	0.01	0.50	<.0001	<.0001	<.0001	<.0001	0.37	0.08	0.00	0.04	0.82	0.80	0.99	0.07

Validity issues applying to the entire research, both internal and external, are described in a designated section further below.

5.2.2 Board size

Board size increased in firms that were larger, older, or more diversified across business segments. However, when these scope of the operations characteristics are combined together to explain board size, their individual explanatory power collapses. As Boone et al. (2007) explain, this is due to the fact that these variables are positively correlated with each other as evident from the correlation matrix presented in Table 11.

Testing the monitoring hypothesis provided mixed results on the relation of board size to the firm's monitoring environment. When used individually in regressions, growth opportunities that were measured with market-to-book ratio and R&D intensity do not appear to lead into smaller boards as was hypothesized. In contrast to the hypothesis, the effect of R&D intensity on board size proves significantly positive when the variable is combined into a single equation with other variables measuring monitoring costs. The measure for risk shows some consistency with negative signs when used both individually and together with other variables, although statistical significance is reached only in combination with other measures for monitoring costs.

When the measures for scope of the operations and monitoring costs are used together, the positive relation of firm size to board size dominates the results. In addition, in contrast to all the other attempts, market-to-book ratio gains statistically significant negative relation with board size that was expected in monitoring hypothesis.

As for control variables, only the existence of a nomination committee shows consistent positive effect across all tests on determinants of board size. However, this variable is likely to suffer from strong endogeneity with board size, since nomination committees are likely to be found in larger boards rather than in smaller boards in the first place.

Finally, potentially the most interesting results for board size come from testing its relation to firm value. The relation of board size to Tobin's Q without consideration to firm-specific complexity proved significantly negative. When giving consideration for

increases in firm complexity, we get signs that larger boards may be value-adding, although this effect could not be statistically proven. One reason for this lack of statistical significance may be our trivial measure for firm complexity. First, in constructing the measure we use crude factors of firm size, firm age, the number of segments based on IFRS reporting, and the proportion of overseas sales, that as such may not properly capture the true complexity of the firm's business. Second, with the exception of the internationality component, constructing the complexity score is based on sample medians, so the measure in effect increases if the firm simply is more complex *in relation* to other firms in the sample, rather than complex in absolute terms. This may lead into our measure both understating and overstating the firm's real complexity.

Overall, our results suggest that the determinants for board size indeed relate to the firm's scope of the operations, and potentially also to its monitoring environment. Furthermore, our findings here suggest that the effect of board size to firm value might not be straightforwardly negative, but depend on firm-specific complexity. This would be in line with the results from Coles et al. (2008), whose study we used as the model in our research. Nonetheless, further evidence is needed to obtain statistically significant relations between board size, firm complexity, and firm value on Finnish data.

5.2.3 The fraction of independent directors

According to scope of the operations hypothesis, the fraction of independent directors increased significantly with firm size, although firm age also appears to have positive impact that however was not proven statistically significant. The sign for the number of segments was positive as expected, but also this coefficient failed to reach statistically significant explanatory power. This could possibly be due to invalidity of our IFRS-based segmentation count to capture the true diversification of the firm's business. The results for determinants of board independence based on scope of the operations are somewhat consistent with those of Boone et al. (2007), although our findings are not as strong.

Monitoring hypothesis proved disappointing in explaining board independence. None of the three variables for monitoring costs shows any signs for compliance with our hypotheses, or any meaningful relation to board independence at all. In turn, the test on negotiation hypothesis implies potential for the expected negative effect of CEO tenure on board independence, however, not at statistically significant level. Our measure for constraints on insider influence, the existence of nomination committee, could not demonstrate any explanatory power. It has to be noted though that our test for this part was done in the simplest manner, and more variables to describe both insider influence and its constraints should be applied to gain better empirical insights into the negotiation hypothesis. For instance, here we omitted important variables for CEO and board insider ownership.

As for control variables, in our sample the existence of dual share class had a consistent negative impact on the fraction of independent directors. This finding appears logical, since the essence of issuing a second share series is to concentrate voting power into the hands of selected stakeholders. Companies with dual share series represent a bit less than one third of the firms in our sample.

The test for the relation of board independence and firm value did not yield any significant results. Used as such and conditional to the firm's R&D intensity that describes needs for insider information, the fraction of non-independent directors did not demonstrate any meaningful pattern with Tobin's Q. One internal validity issue affecting our results is the fact that we use the fraction of non-independent directors, instead of the fraction of insider directors that was used by Coles et al. (2008) in the study used as the model here. Non-independent directors include both inside directors and affiliated outside directors, and thereby our measure for insider information present in the board is practically overstated for some companies.

Altogether, the variables describing the firm's scope seem to define board independence largely as expected. However, what is unfortunate for our interest in a more varied view to the firm's internal governance, the empirical evidence on the relation of monitoring environment to the fraction of independent directors, as well as board composition's

effect on firm value did not bring any results. Our primitive test on the negotiation hypothesis yielded elementary evidence that further investigation on the CEO's influence on board composition could be warranted. For the validity of our measures, it should be noted that we relied on firms' statements on director independence, without deeper examination on whether this information was accurate. Furthermore, as stated in the above, we did not make difference between affiliated and non-affiliated outsiders that would bring better insights into board composition.

5.2.4 Presence of female and foreigner directors

Our own extensions to the model on determinants of board structures by Boone et al. (2007) included examining the effect of the firm's operational scope to presence of female and foreigner directors in the board. The rationale behind including these variables into scope of the operations hypothesis is that greater business complexity should call for more diversity to the board work as well. We examine female and foreign director presence only in a descriptive manner, since we have not presented any deeper background theory on how they should interrelate with corporate boards or performance.

Female directors were identified in 56 companies that represent about half of our sample. Our multivariate results suggest more female presence in larger and older firms, presumably because these firm attributes tend to lead into bigger board size as well. Foreigner directors could be located in 34 companies that presents about one third of the sample. Foreigner presence increased evidently with firm size and in particular with the firm's international intensity, as measured by our measure that is based on overseas sales. As for the positive effect of firm size for female and foreigner director presence, our results are consistent with those of Randøy et al. (2006) on Scandinavian boards.

5.3 Internal and external validity of results

As Hermalin and Weisbach (2003) describe, research on boards and governance in general are prone to issues of endogeneities between variables, as well as equilibrium versus off-equilibrium interpretation of results. Endogeneity means that one variable may be both cause and consequence with regards to the other variable. For instance, it could be questioned whether the presence of foreign directors is a result of the firm's

internationality as presented in the above, or if internationality follows the presence of foreigners in the board.

Equilibrium versus off-equilibrium interpretation of results means that the observed relation between two variables can effectively be caused by yet another factor that influences both studies variables. A straightforward example of this, also used for illustration by Hermalin and Weisbach, is our result for negative relation between board size and Tobin's Q. According to the equilibrium interpretation, there is a third factor that affects both the board size and Tobin's Q. As per the off-equilibrium interpretation, too large boards indeed are negatively affecting Tobin's Q.

Furthermore, Denis (2001) points out that no relationship between the examined variable and performance might be revealed in case all studied firms are in balance with the given issue. In addition, what is good governance depends on firm-specific characteristics. Thereby, finding a governance-performance relationship might be disturbed if necessary control factors are not introduced into the analysis. In our study, we mainly relied on the sets of controls variables used in those studies that we used as our models. In other words, we did not formally define control factors based on the particular business and governance environments that our sample is subject to.

For external generalizations, our results suffer from some shortcomings related to our sample and methodology that limit the potential to make general conclusions on these findings. First, our sample size is substantially small with only 107 companies in the sample total and most regressions completed with less than full sample. Second, our study is based on a single year's data, although we attempt to take board, firm, and performance characteristics from different parts of the year so that their causalities would be logical. Finally, the methodology we use, ordinary least squared (OLS) regressions, is applied in the simplest manner. We do not present alternative methodologies to obtain comparative results, nor complete the many robustness tests that are done in the studies we refer to.

Overall, the results we obtain should be considered rather as an exploratory effort to discover potential areas for further research on Finnish boards. To confirm our preliminary findings, data sets over longer periods of time should be tested, and more reliable methodologies ought to be used.

6. Conclusions

In this paper we studied determinants of board structures for board size, board composition, female director presence, and foreigner director presence. Our sample group consisted of 107 Finnish public listed corporations and the data was based on the year 2007. The objective of the research was to examine if firm-specific operational and governance environments determine board structures in sample firms. In the following, we will summarize our key findings, validity of results, suggestions for further research, and practical implications of our results.

6.1 Key findings of the study

To study how different board structures relate to firm characteristics, we applied scope of the operations hypothesis, monitoring hypothesis, and negotiation hypothesis developed by Boone et al. (2007). Consistent with scope of the operations hypothesis, we find statistically significant empirical evidence that board size, board independence, and presence of female directors increase with firm size, firm age, and the number of segments. Our results also prove that presence of foreigner directors increases with the importance of overseas sales to the firm.

For monitoring hypothesis, we expected to find smaller boards in firms with greater monitoring costs. We do find some support that board size decreases in firms with increased share price volatility. In contrast, R&D intensity that we used to proxy for growth opportunities appears to contribute positively to board size. In examining monitoring-based determinants for the fraction of independent board members, we did not find any evidence based on our actual monitoring cost variables. As a side product from our control variables, we found that dual share series has a consistent negative effect on board independence.

Negotiation hypothesis provided some weak signs that the expected negative relation between insider influence and the fraction of independent directors could empirically exist in our sample. However, we only used CEO tenure as a measure for insider influence, and our result was not statistically significant. Furthermore, our only measure

for constraint on insider influence, the existence of a nomination committee, failed to show the expected relation at meaningful significance levels.

Following the examination on determinants of board structures, we attempted testing the relation of board size and board composition to firm value, giving consideration to firm complexity and R&D intensity. Our purpose here was to take into account firm-specific needs for advisory and insider information, as presented by Coles et al. (2008). In empirical testing, we also applied the methodology provided by these authors. Our results did not establish statistical significance that larger boards create value in more complex firms. However, for possible further research, we consider it worthwhile to note that we managed to turn the significant negative effect of board size on Tobin's Q into a positive coefficient when we gave consideration to complexity of the firm. In contrast, linking the non-independent fraction of board members with the firm's R&D intensity did not show any effect on the firm value.

6.2 Validity of results

There are some important internal and external validity constraints in interpreting and making generalizations from our results. First, our sample size is substantially small with only 107 companies in the sample total, and many of the empirical tests were performed with less than full sample. Second, we only use data from one year, and the results are thereby subject to short-term randomness that would be reduced with data over longer time periods. Third, the methodologies employed in our empirical tests are very simple. We only perform the most basic ordinary least squares regressions, and we do not make comprehensive robustness checks as were done in the studies that we use as our models. Finally, we largely replicated other authors' empirical models without attempting to make adjustments for business and governance environments particular to our sample firms.

6.3 Suggestions for further research

Research on boards of directors, as well as corporate governance overall, is challenging field for developing sound empirical models. As illustrated in this paper, boards by definition are subject to several and sometimes conflicting requirements. Furthermore, these requirements vary across firms with respect to their particular business and

governance environments. Empirical examination of boards is complicated by the fact that the two main duties of the board, monitoring and advising the management, are highly intangible by nature.

What is more, corporate governance fundamentally deals with motivations that affect decision-making, and boards in the end are institutions made of people, meaning that human factors inevitably affect the board's work. Thereby, in attempting to find out how boards affect firm performance, we have to pay attention to both how the board fits the particular firm-context, and how the board functions as an organization. Some traditional variables used in board research serve both purposes, such as board size. However, to obtain a more precise picture on boards particularly as decision-making institutions requires closer look into internal board dynamics.

The variety of factors affecting boards and complexity of their interrelations may be one reason that we have not encountered that many formal models on boards, as noted by Hermalin and Weisbach (2003) while summarizing research on boards until the date. This paper was a rather general attempt to link board characteristics with the firm's business and governance conditions, and more detailed models need to be developed to better explain effective determinants of board structures, as well as the board's contribution to firm value. The three hypotheses provided by Boone et al. (2007) that were used in this study provide a systematic basis for approaching determinants of board structures, and these hypotheses should be tested with wider sets of variables than was done in this paper. Furthermore, rather than testing the effect of some board structure on firm value on stand-alone basis, it is more insightful to examine value effects of boards with consideration to the related firm context. In doing this, methodologies comparable to the one developed by Coles et al. (2008) can be applied.

6.4 Practical implications

The results of this study at least to some extent supported our assumption that board structures are determined based on firm-specific characteristics. Consequently, there is not likely to be a single best way to set up a board, but the correct structure depends on the firm's particular environment. This implication is relevant for considerations on

making recommendations on or regulating board structures, such as board size and the fraction of independent directors. Prior to issuing guidelines on how boards should be arranged, it should be considered whether certain board structures add value given the firm's particular operational and governance environments.

Attachments

Attachment 1. Contents of the Corporate Governance Recommendation for Listed Companies (2004)

List of references

Adams, Almeida, Ferreira, 2005. Powerful CEOs and their impact on corporate performance. The Review of Financial Studies, volume 18, p.1403-1432.

Baysinger, Kosnik, Turk, 1991. Effect of board and ownership structure on corporate R&D strategy. Academy of Management Journal, volume 34, p.205-214.

Becht, Bolton, Röell, 2002. Corporate Governance and Control. European Corporate Governancen Institute: ECGI Working Paper Series in Finance.

Bernheim, Whinston, 1986. Common Agency. Econometrica, volume 54, p.923-942.

Boone, Field, Karpoff, Raheja, 2007. The determinants of corporate board size and composition: An empirical analysis. Journal of Financial Economics, volume 85, p.66-101.

Carter, Simkins, Simpson, 2003. Corporate Governance, Board Diversity, and Firm Value. The Financial Review, volume 38, p.33-53.

Coles, Daniel, Naveen, 2008. Boards: Does one size fit all? Journal of Financial Economics, volume 87, p.329-356.

Corporate Governance Recommendation for Listed Companies, 2003. HEX Plc, the Central Chamber of Commerce of Finland and the Confederation of Finnish Industry and Employers.

Demski, 2003. Corporate Conflicts of Interest. Journal of Economic Perspectives, volume 17, p.51-72.

Denis, 2001. Twenty-five years of corporate governance research ...and counting. Journal of Financial Economics, volume 10, p.191-212.

Denis, McConnell, 2003. International Corporate Governance. European Corporate Governancen Institute: ECGI Working Paper Series in Finance.

Denis, Sarin, 1999. Ownership and board structures in publicly traded corporations. Journal of Financial Economics, volume 52, p.187-223.

Doidge, Karolyi, Stulz, 2007. Why do countries matter so much for corporate governance? Journal of Financial Economics, volume 86, p.1-39.

Dougherty, Christopher, 2007. *Introduction to Econometrics*. Third edition. Oxford.

Eisenberg, Sundgren, Wells, 1998. Larger board size and decreasing firm value in small firms. Journal of Financial Economics, volume 48, p.35-54.

Fama, Jensen, 1983. Separation of Ownership and Control. Journal of Law and Economics, volume 26, p.301-325.

Freeman, Reed, 1983. Stockholders and Stakeholders: A New Perspective on Corporate Governance. California Management Review, volume 25, p.88-106.

Finnish Limited Liability Companies Act, 2007.

Hart, 1995. Corporate Governance: Some Theory and Implications. The Economic Journal, volume 105, p.678-689.

Hermalin, Weisbach, 1988. The determinants of board composition. The RAND Journal of Economics, volume 19, p.589-606.

Weisbach, 1988. Outside directors and CEO turnover. Journal of Financial Economics, volume 20, p.431-460.

Hermalin, Weisbach, 1991. The effects of board composition and direct incentives on firm performance. Financial Management, Winter 1991, p.103-112.

Hermalin, Weisbach, 2003. Boards of Directors as an Endogeneously Determined Institution: A Survey of the Economic Literature. FRBNY Economic Policy Review, p.7-26.

Hyytinen, Kuosa, Takatalo, 2003. Law or Finance: Evidence from Finland. European Journal of Law and Economics, volume 16, p.59-89.

Jensen, 1993. The Modern Industrial Revolution, Exit and the Failure of Internal Control Systems. The Journal of Finance, volume 48, Papers and Proceedings of the Fifty-Third Annual Meeting of the American Finance Association: Anaheim, California January 5-7, 1993, p.831-880.

Jensen, 2001. Value Maximization, Stakeholder Theory, and the Corporate Objective Function. Journal of Applied Corporate Finance, volume 14, p.8-21.

Jensen, Meckling, 1976. Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. Journal of Financial Economics,volume 3, p.305-360.

Li, 1994. Ownership structure and board composition: a multi-country test of agency predictions. Managerial and Decision Economics, volume 15, Special Issue: Aspects of Corporate Governance, p.359-368.

Linck, Netter, Yang, 2008. The determinants of board structure. Journal of Financial Economics, volume 87, p.308-328.

Moerland, 1995. Alternative disciplinary mechanisms in different corporate systems. Journal of Economic Behavior and Organization, volume 26, p.17-34.

Morck, Shleifer, Vishny, 1989. Alternative Mechanisms for Corporate Control. The American Economic Review, volume 79, p.842-852.

Murphy, McIntyre, 2007. Board of director performance: a group dynamics perspective. Corporate Governance, volume 7, p.209-224.

OECD, 2004. OECD Principles of Corporate Governance.

Pajarinen, Ylä-Anttila, 2006. Omistajuus ja yritysten menestyminen: analyysia suomalaisella aineistolla. ETLA: Keskusteluaiheita - Discussion papers No.1007.

Pfeffer, 1972. Size and Composition of Corporate Boards of Directors: The Organization and its Environment. Administrative Science Quarterly, volume 17, p.218-228.

Randøy, Oxelheim, 2003. The impact of foreign board membership on firm value. Journal of Banking and Finance, volume 27, p.2369-2392.

Randøy, Oxelheim, Thomsen, 2006. A Nordic Perspective on Corporate Board Diversity. Nordic Innovation Centre.

Reaz, Hossain, 2007. Corporate Governance around the World: An Investigation. Journal of American Academy of Business, Cambridge, volume 11, p.169-175.

Recommendation Regarding the Procedures to be Complied with in Takeover Bids (Helsinki Takeover Code), 2006. The Panel on Takeovers and Mergers, the Central Chamber of Commerce of Finland.

Roe, 1994. The Institutions of Corporate Governance. Harvard, John M. Olin Center for Law, Economics and Business, Discussion Paper No. 488.

Shivdasani, Yermack, 1999. CEO involvement in the selection of new board members: an empirical analysis. The Journal of Finance, volume 54, p.1829-1853.

Shleifer, Vishny, 1997. A Survey of Corporate Governance. The Journal of Finance, volume 52, p.737-783.

Sotka, Vuori, 2001. Finnish companies act and management liabilities, some issues. International Financial Law Review: The IFLR Guide to Corporate Governance, p.101-105.

Tenhunen, 2005. Finnish corporate governance. Corporate Finance, p.20-21.

Tähtinen, Kivinen, 2002. Finland: Corporate governance gains importance. International Financial Law Review: The IFLR Guide to Corporate Governance 2002, p.95-98.

Vilanova, 2007. Neither Shareholder nor Stakeholder Management: What Happens When Firms are Run for their Short-term Salient Stakeholder? European Management Journal, volume 25, p.146-162.

Weimer, Pape, 1999. A Taxonomy of Systems of Corporate Governance. Corporate Governance, volume 7, p.152-166.

Yermack, 1996. Higher market valuation of companies with a small board of directors. Journal of Financial Economics, volume 40, p.185-211.

Ylä-Anttila, Ali-Yrkkö, Nyberg, 2004. Foreign Ownership in Finland - Boosting Firm Performance and Changing Corporate Governance. ETLA: Keskusteluaiheita - Discussion papers No.904.

Internet sources

The Securities Market Association. http://www.cgfinland.fi. Accessed on 12th March 2008.

Pörssitieto. http://www.porssitieto.fi. Accessed in April/May 2008.